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Run Control &
Run Configuration
26-Mar-2004

How to start, configure and operate CDF Run Control

Run Control, main window

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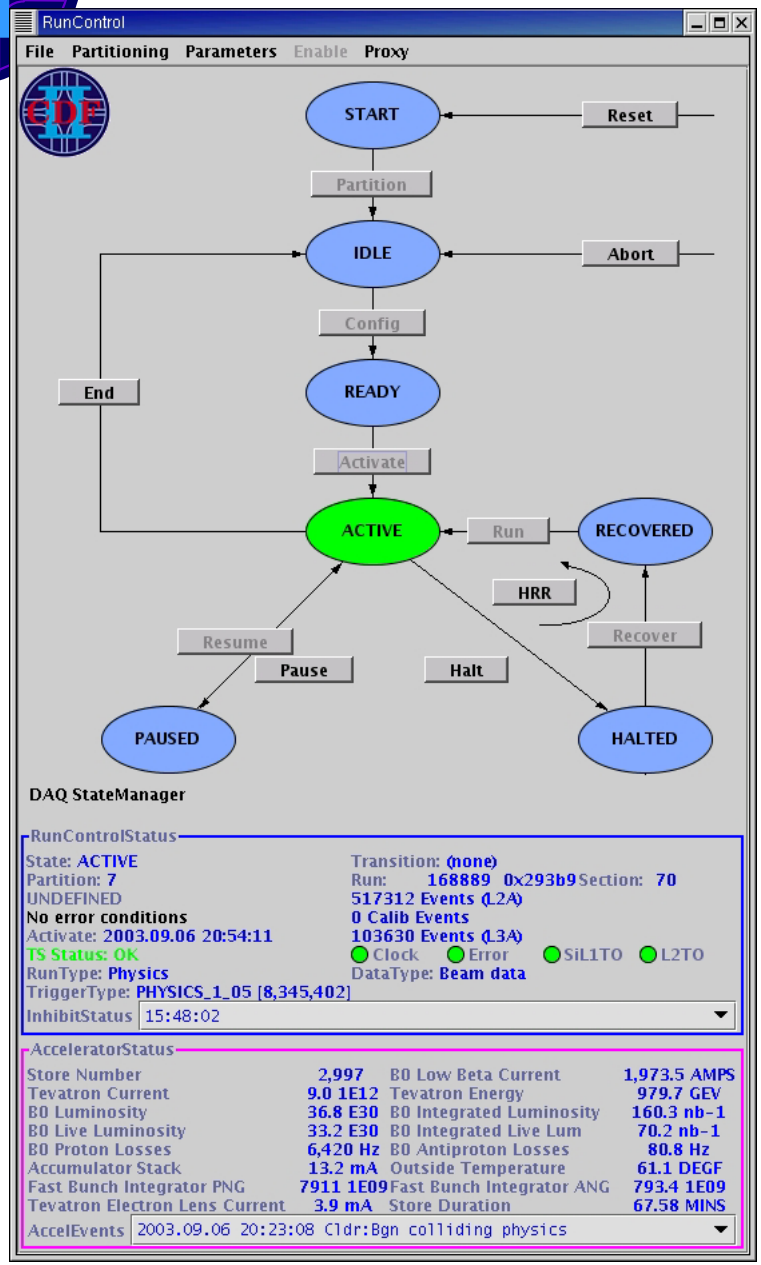

Main Run Control Window: Includes State Manager, Configuration pull-down menus, Run Control Status, and Accelerator Status panels

Start Run Control:

setup fer

rc

(Aces use *cdfdaq* account)

Just 3 steps to run!

1. *Select State Manager*
2. *Select Partition*
3. *Select Configuration*

Run!

State Manager Selection

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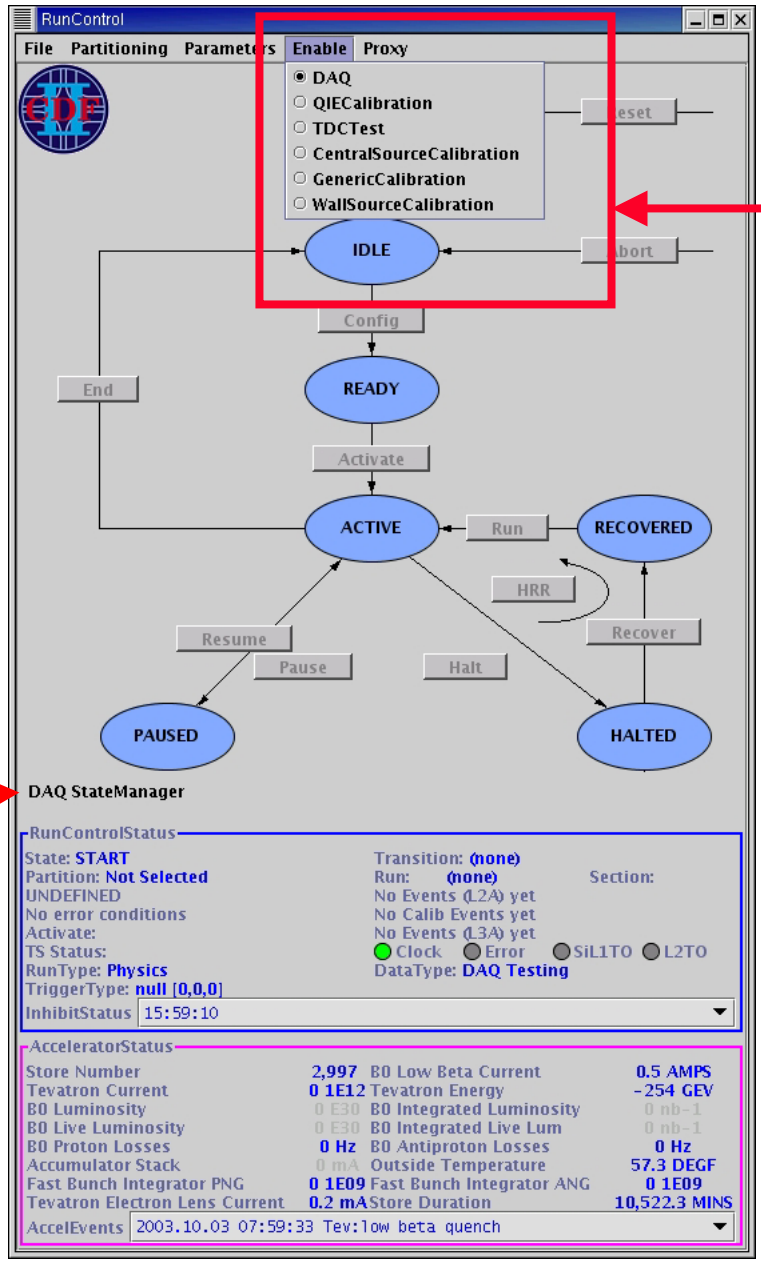

StateManager title

Select State Manager:

- Usually **DAQ**, default on startup
- **GenericCalibration** for calibrations unless specific menu item for given run type: e.g., **QIE Calibration**
- Source and TDC testing are primarily for experts

The State Manager determines the flow of control when cycling through runs

Select Partition

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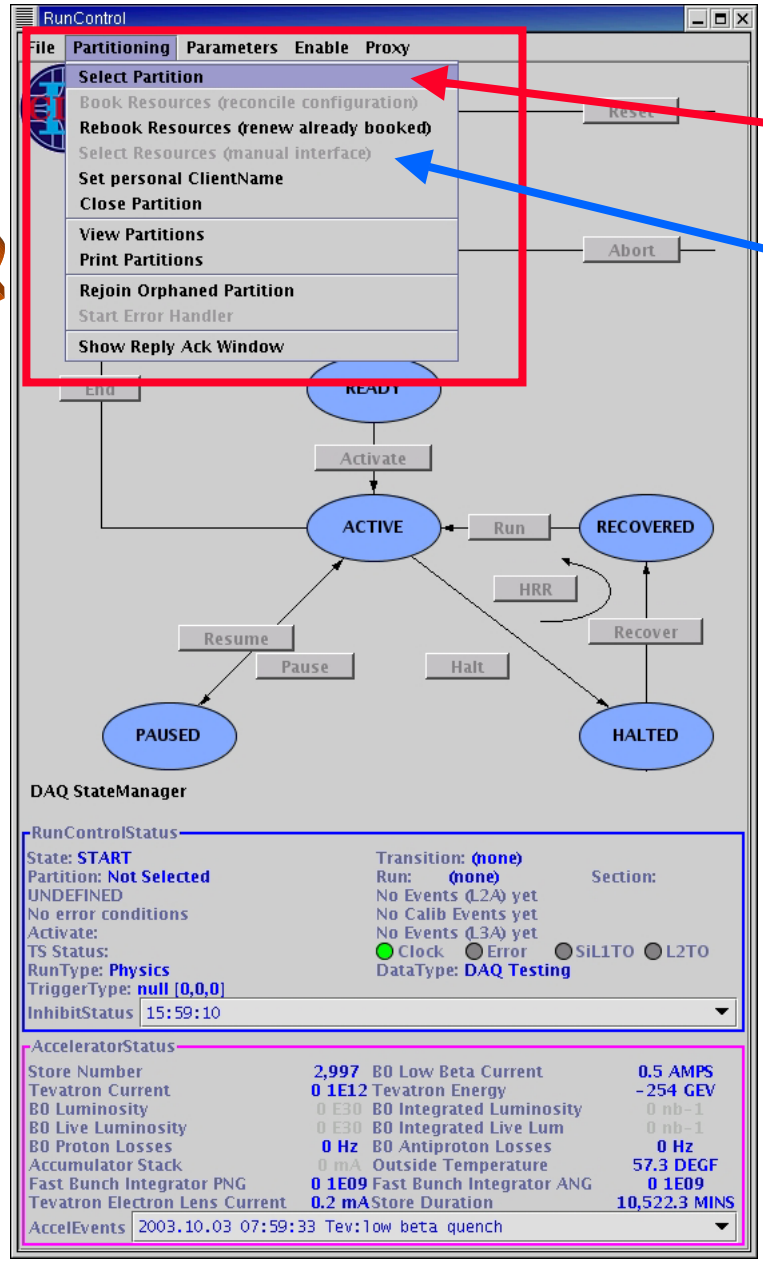
Step 2



Select partition

Select or view resources manually (via GUI)
(enabled after partition selected)

Each Run Control Session must be allocate a *Partition*

Each front end crate belongs to no more than one *Partition*

Partitions allow resource locking and prevent collisions between sessions

Partition Selector

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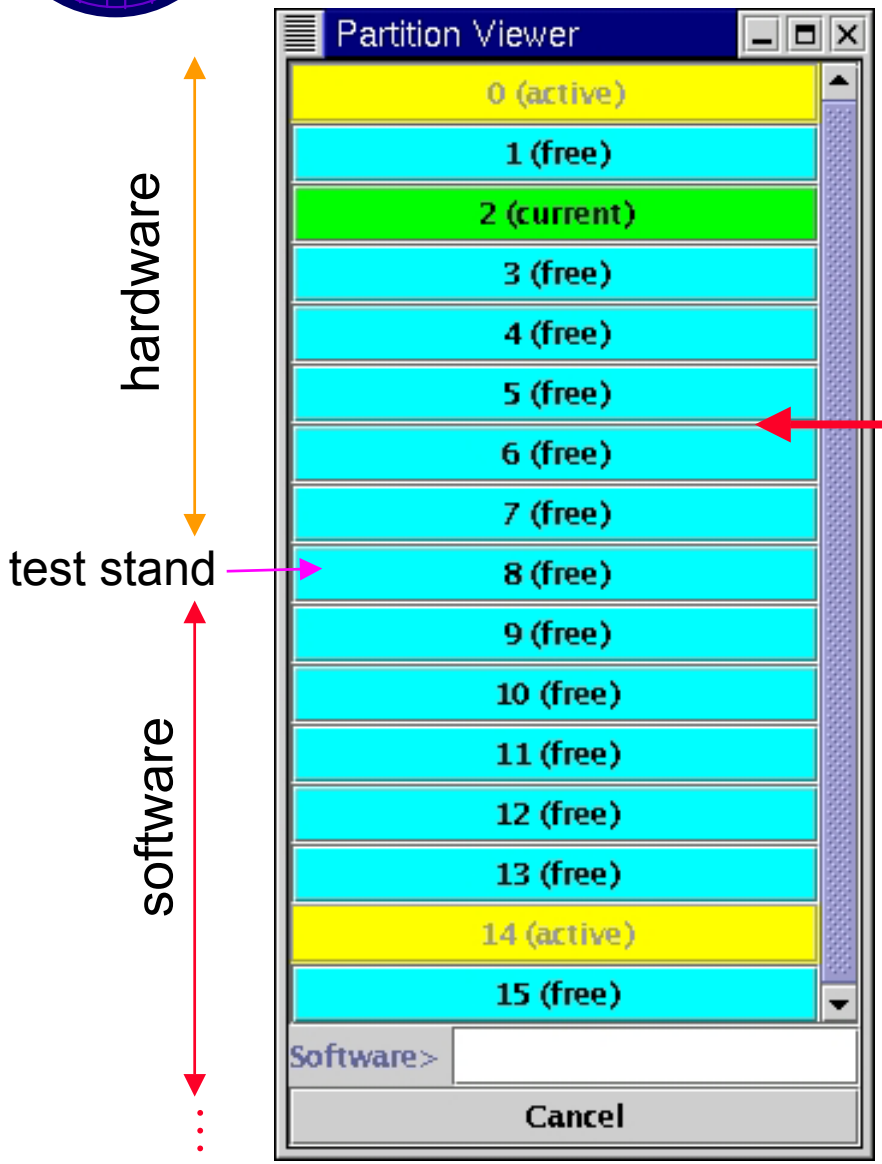

Select Partition:

- Cyan is free
- Yellow is owned by another
- Green is yours
- Mouse over to display owner and hardware/software status

- 0–7 hardware partitions
- 8 test stand partition
- 9–15 software partitions

Resource Selector

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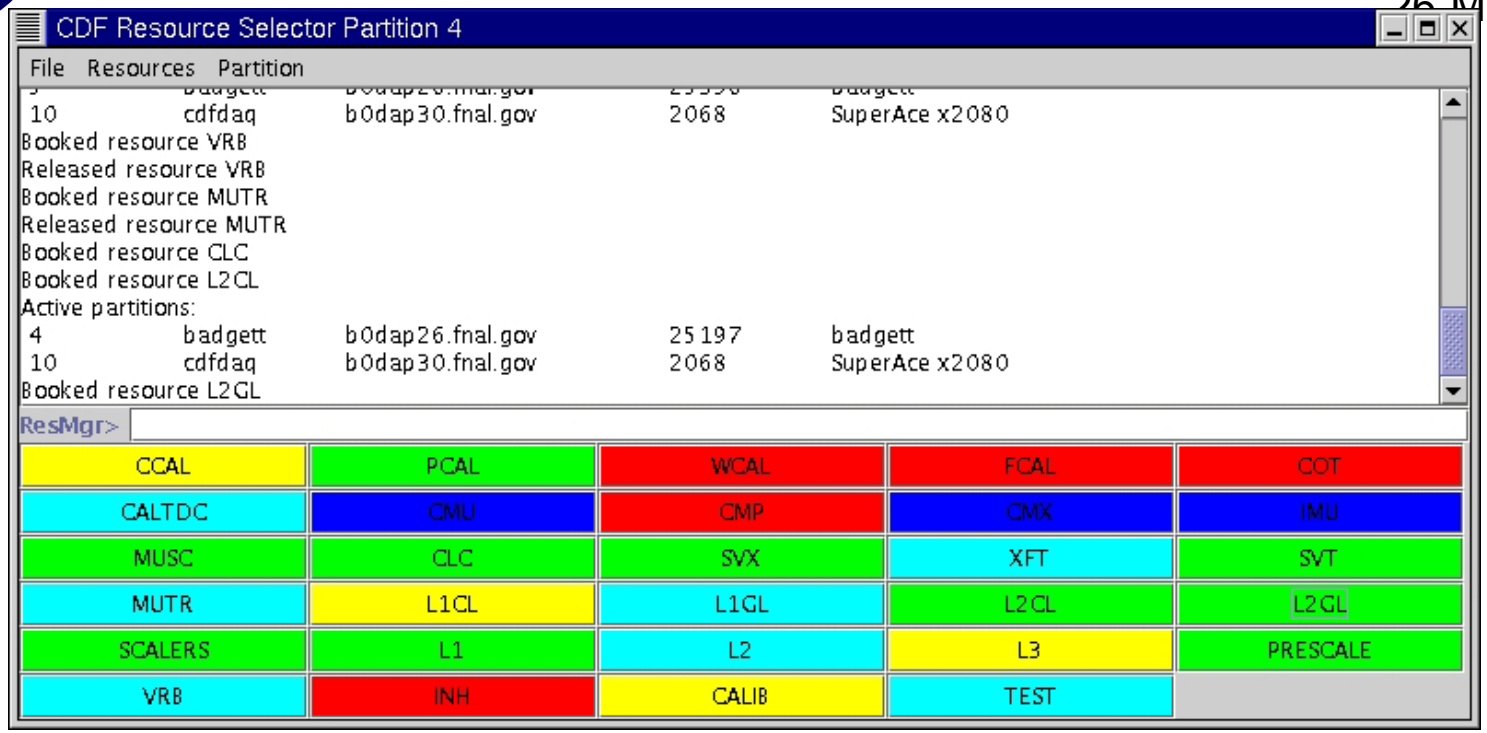

Select Resources:

- Cyan is entirely free
- Red is entirely owned by another partition
- Blue is partially owned by another partition
- Yellow is partially yours
- Green is entirely yours
- Mouse over to display owner
- Click to book/unbook; Right-click for more info

Selecting Run Configuration

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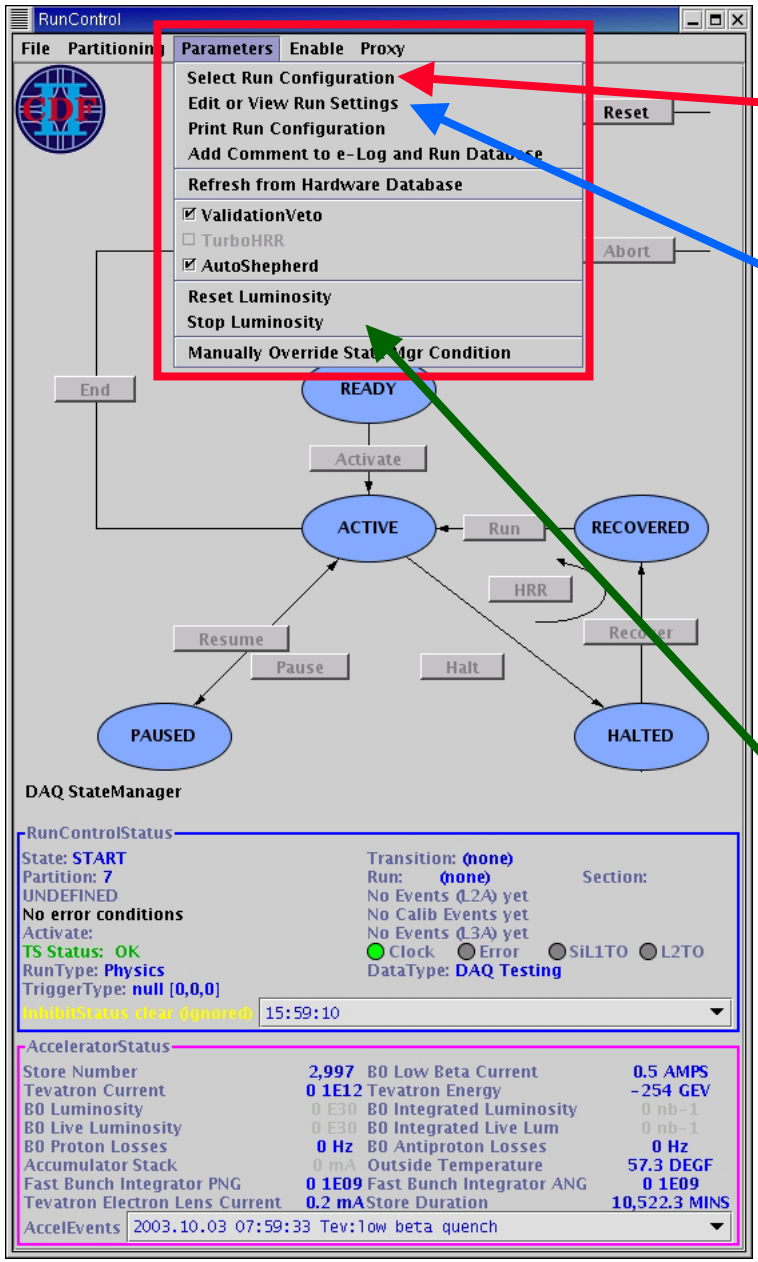
Step 3



Select predefined run configuration

Edit or view run configuration

Frank sez:
"This is the ace's most important duty!"

Reset or stop luminosity counters at beginning and end of stores -- *only if automatic reset fails!*

After selecting a configuration, you're ready to start a run!

Run Configuration Selector

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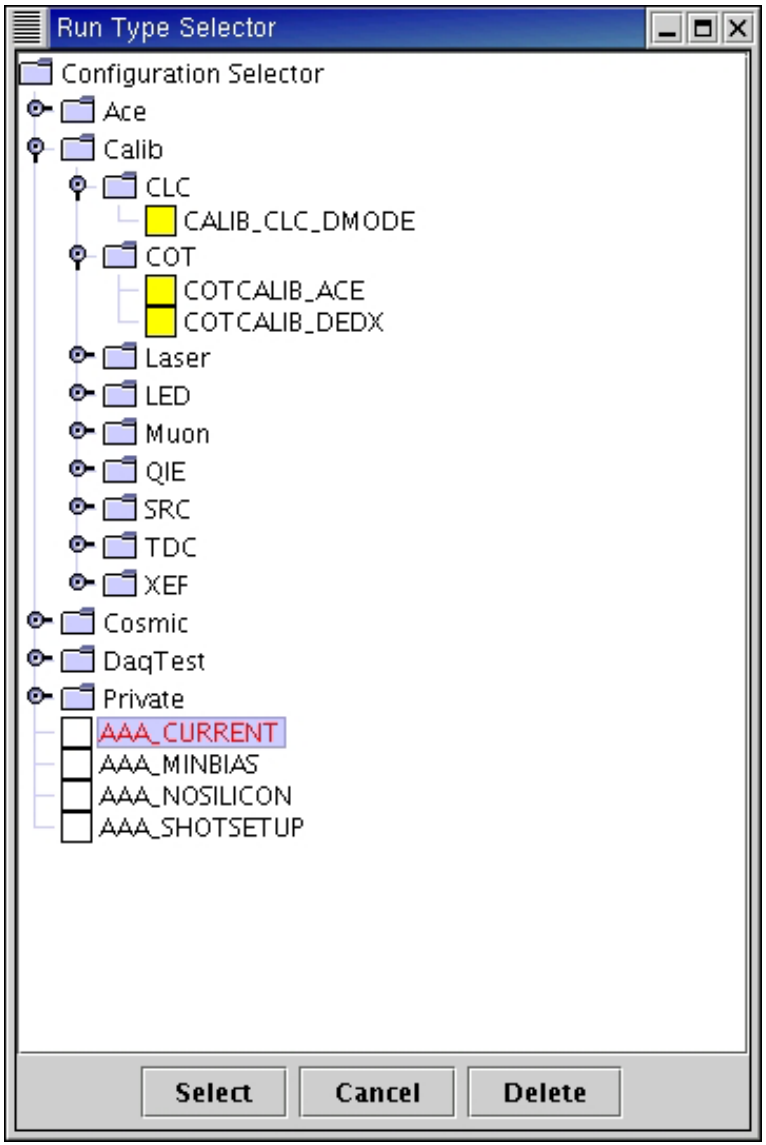

Select from predefined run configurations

- *Ace* directory contains all physics and test runs for the Ace, and is maintained by Ops Managers
- *Cosmic* directory for Cosmic Ray runs
- *Calib* directory contains calibration configurations, and is maintained by component experts in subdirectories
- Other directories for private testing purposes

Or create your own configuration!

Run Settings Window, standard

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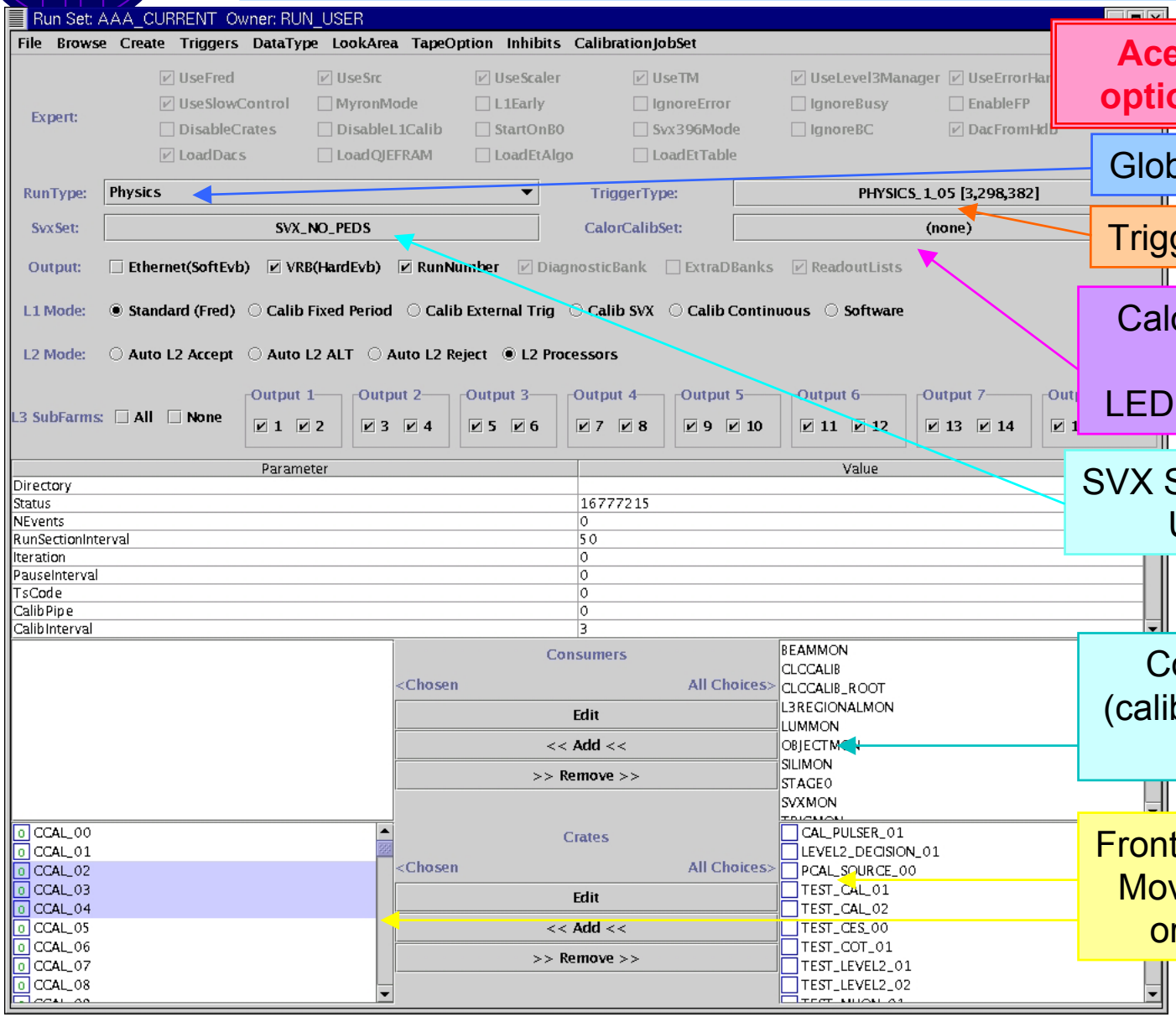

Aces should know all options on this window

Global DAQ RunType

Trigger Table, coupled

CalorCalibSet, when Plug source, LED, Xenon run types

SVX Set, when SVX is used Usually FIBTEST

Consumer Selection (calibration run types only for now)

Front end crate selection Move to left to include or right to exclude

Run Settings, Expert Options

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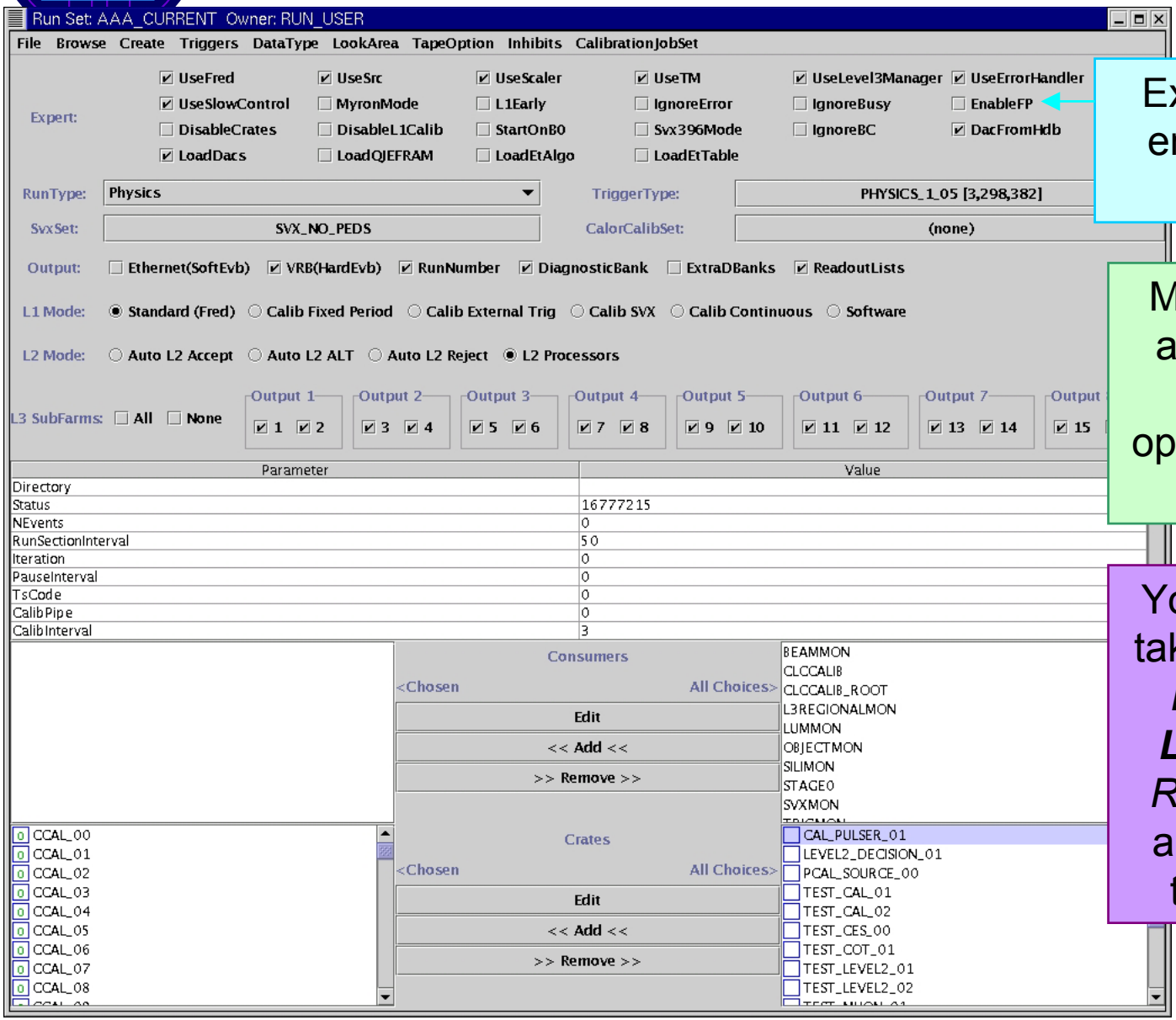

Expert options can be enabled from the *File* pull-down menu

Many expert options are triggered by the selection of other options or the addition of crates

You may be asked to take special runs, e.g. ***MyronMode*** with ***L1Early***, or without *ReadoutLists*, which are only available in the expert options

Trigger Inhibits

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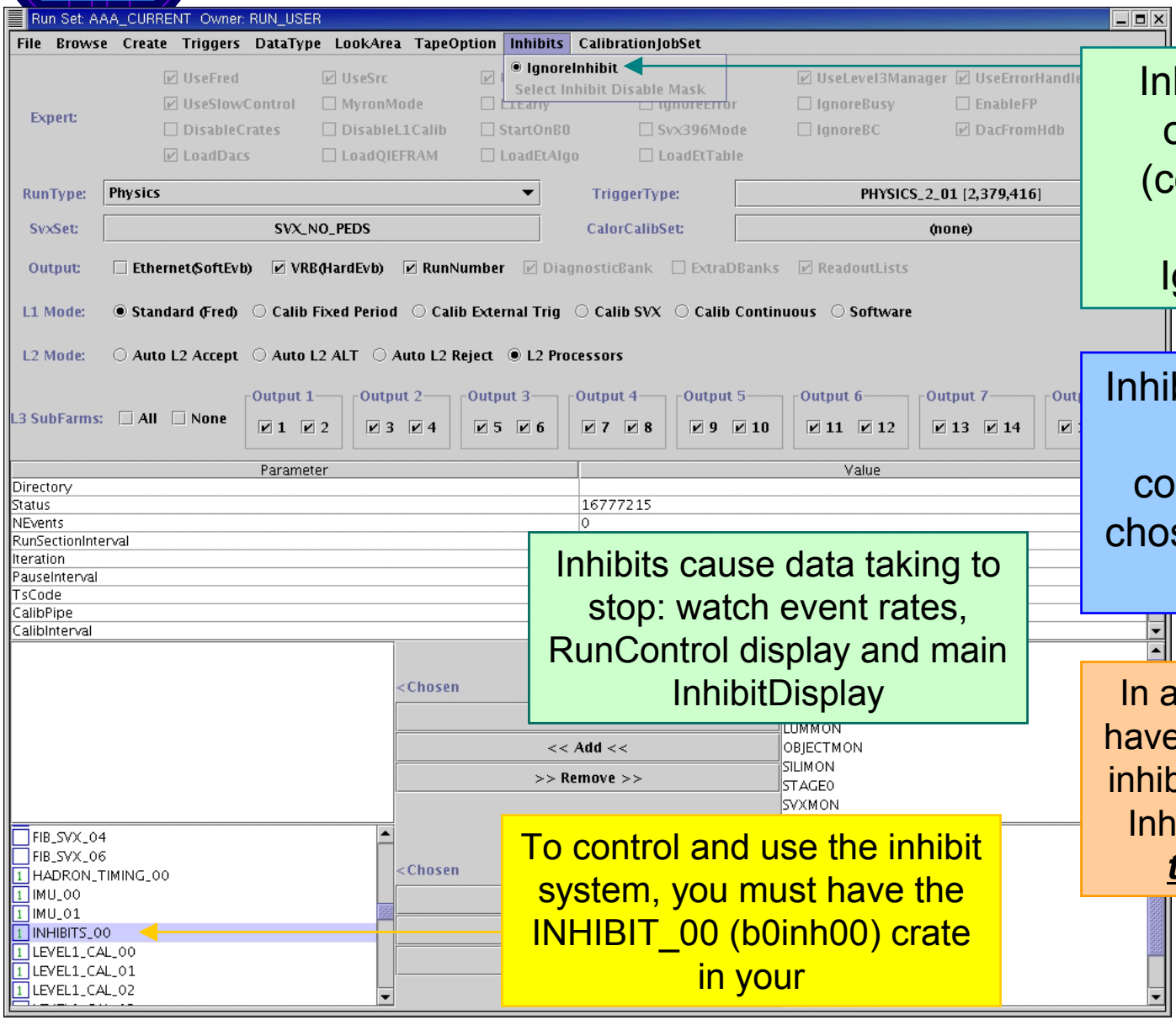

Inhibits normally used only during physics (colliding beam) runs, otherwise set IgnoreInhibit to true

Inhibit sources are tied to the crates and components you have chosen, and are selected automatically

Inhibits cause data taking to stop: watch event rates, RunControl display and main InhibitDisplay

In an emergency, you may have to disable misbehaving inhibit signals from the main InhibitDisplay GUI ***before the run is activated***

To control and use the inhibit system, you must have the INHIBIT_00 (b0inh00) crate in your

Trigger Inhibit on RunControl

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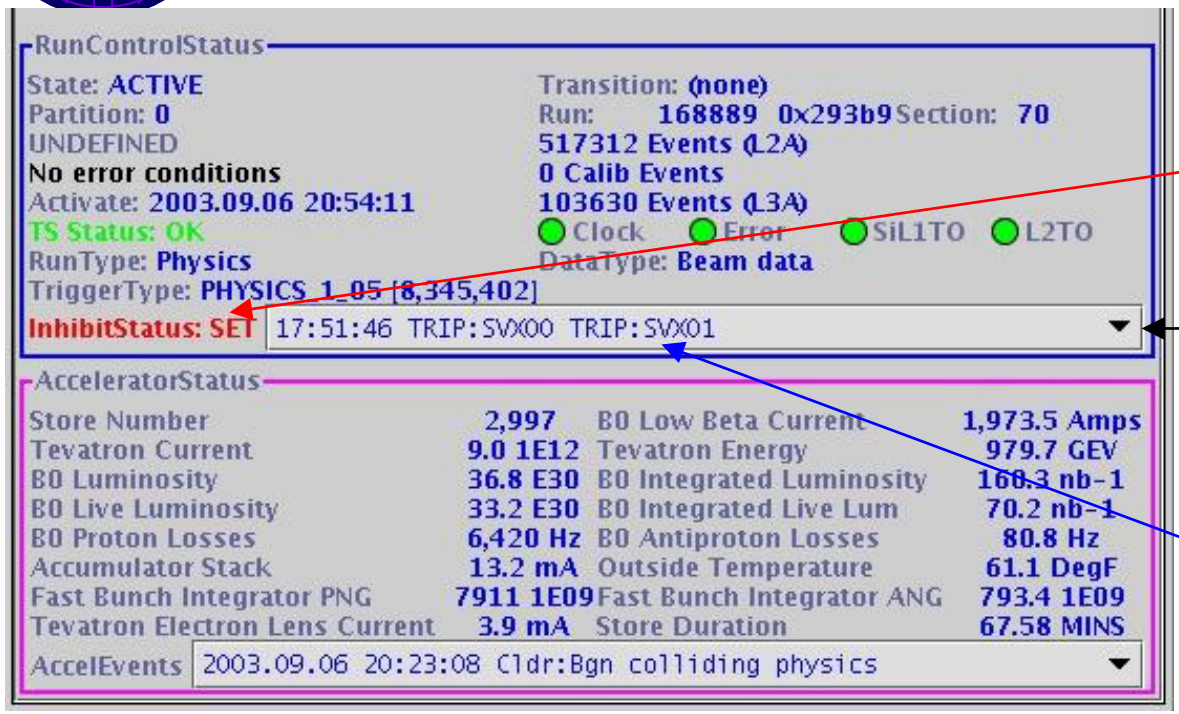


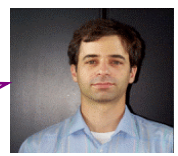
In this case, the Inhibit is **SET**, indicating data taking has stopped

Click on the pop-up to get a history of trips

The guilty components here are TRIP:SVX00 and TRIP:SVX01

RunControl crate: **INHIBITS_00** *b0inh00*

Jonatron sez:
"Selecting the Inhibitions is the Ace's most important duty!"



This is the *new* Inhibit system from
…December 2003…

New Inhibit System Control

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See Jonathan Lewis's Trigger Inhibit talk

- Consolidated system with one control GUI (above)
- Replaces iFix and RunControl panels
- Display similar to other monitors, e.g. VxMon
- Enable and disable inhibits before ***Activate*** transition

RunControl crate: **INHIBITS_00** *b0inh00*

Data Type Selection

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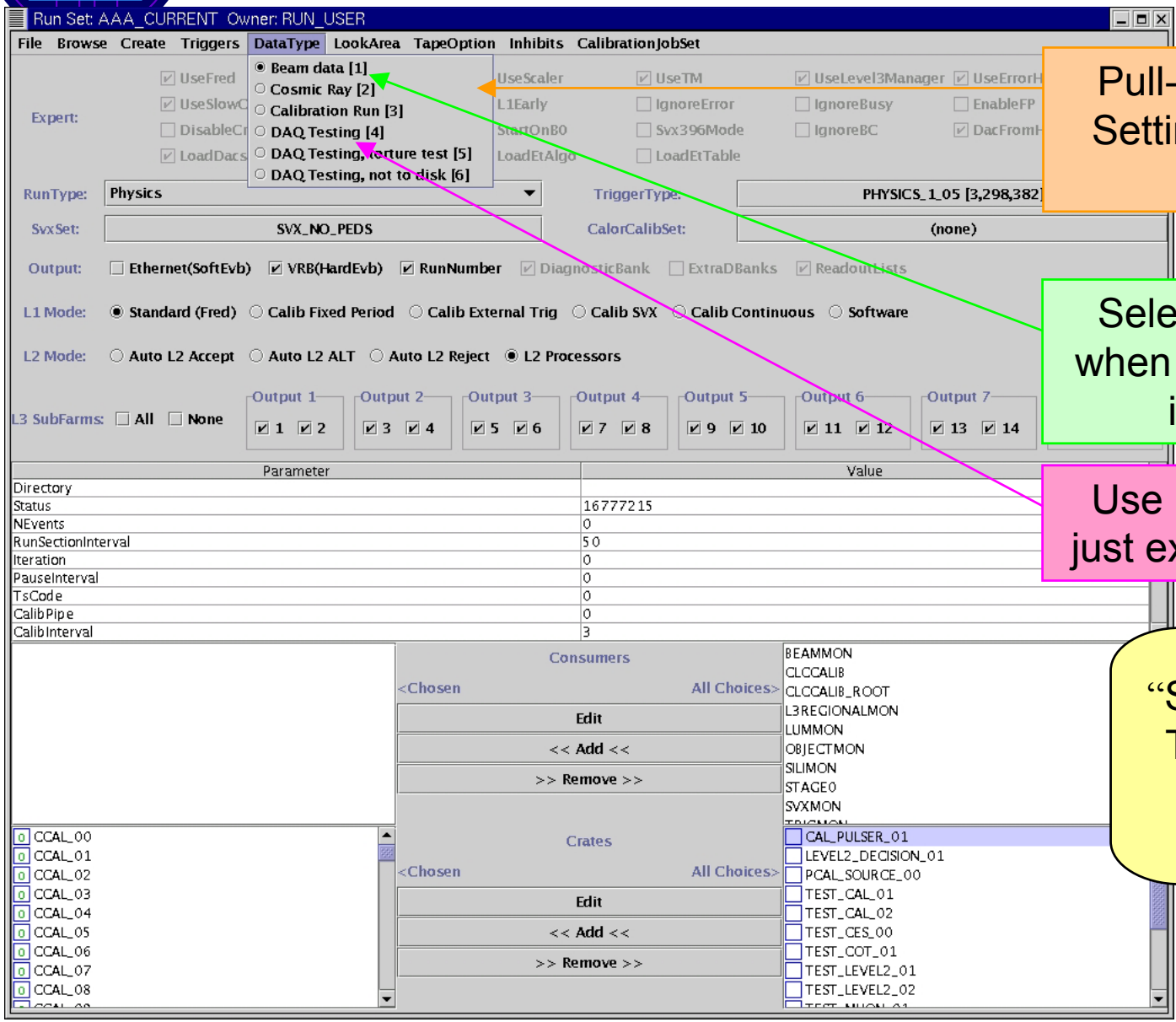

Pull-down menu in Run Settings window selects data types

Select *Beam Data* only when colliding beams are in the Tevatron

Use DAQ Testing when just exercising the system

Tony sez:
"Selecting the Data Type is the Ace's most important Duty"

Data Storage Control

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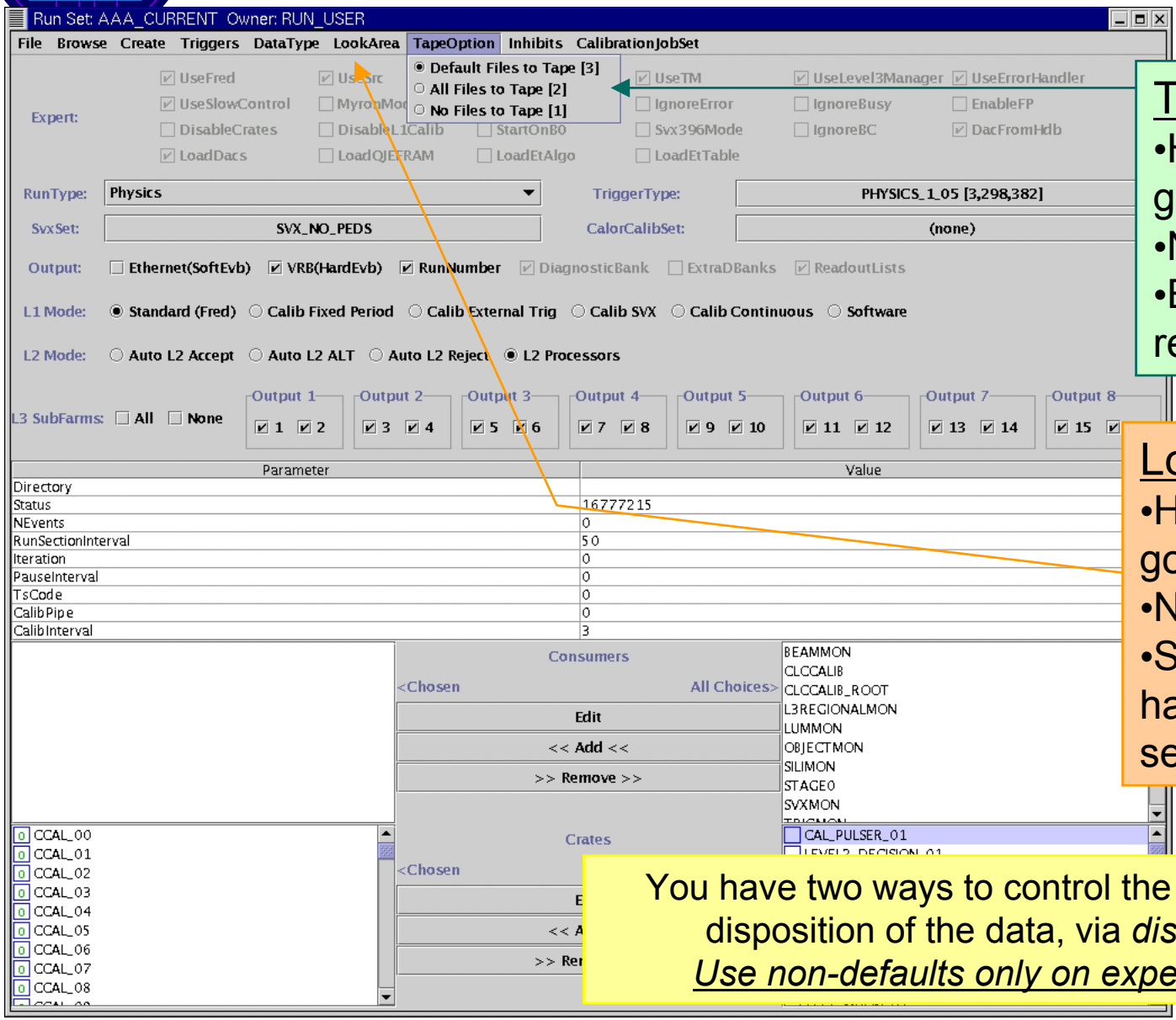

TapeOption:
- How much data goes to tape
- Normally **Default**
- Except special runs request

LookArea:
- How much data goes to disk
- Normally **Default**
- Special runs may have different setting

You have two ways to control the final storage disposition of the data, via *disk* or *tape*
Use non-defaults only on expert request

Trigger Type Selection

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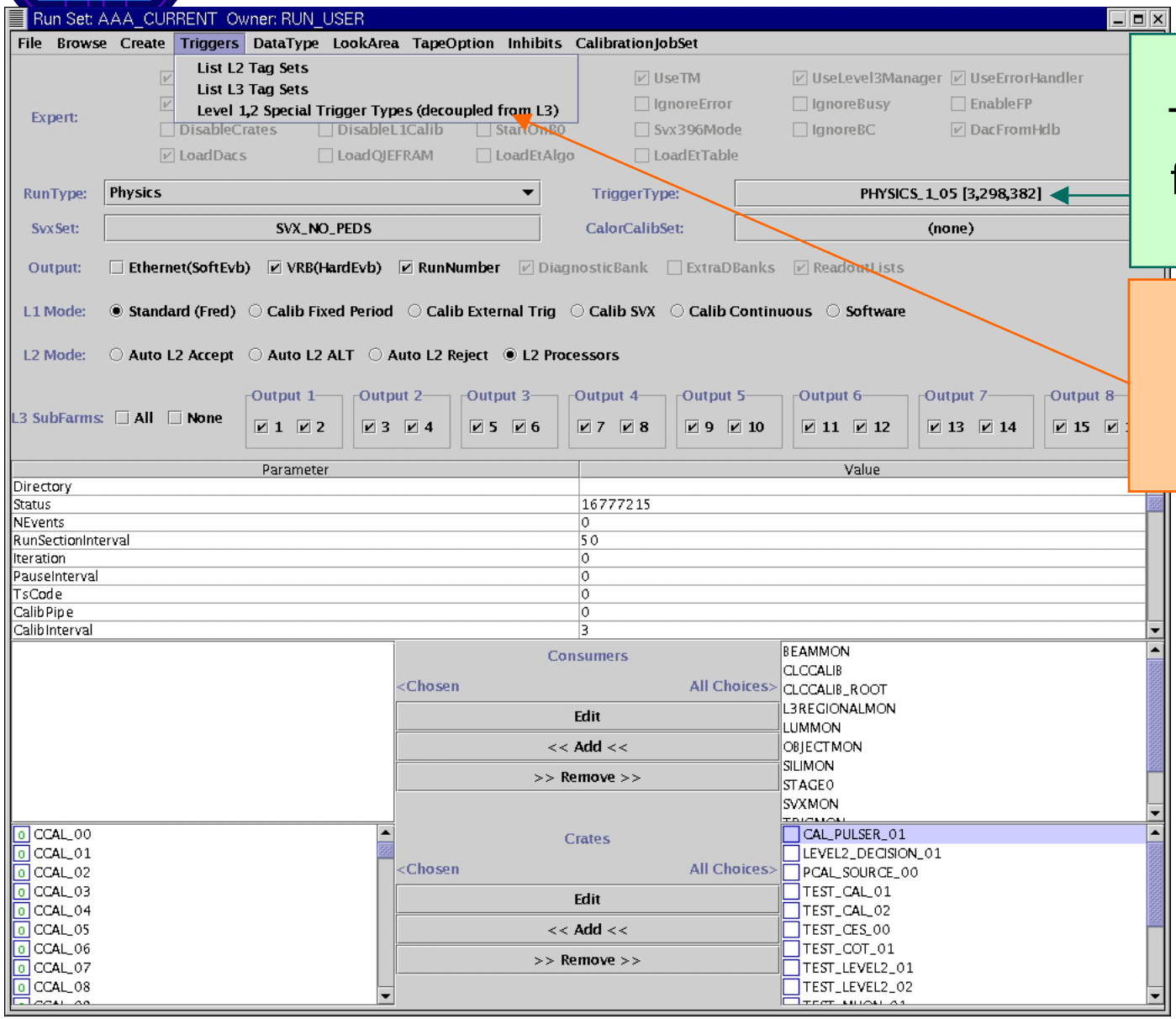

Select *coupled* Trigger Table here for normal physics running

Select decoupled tables here for testing, cosmics, minbias, l2torture

Coupled tables are fully specified from Level 1, Level 2 through Level 3

Synonyms:
TriggerType =
TriggerTable =
PhysicsTable

Coupled Trigger Tables

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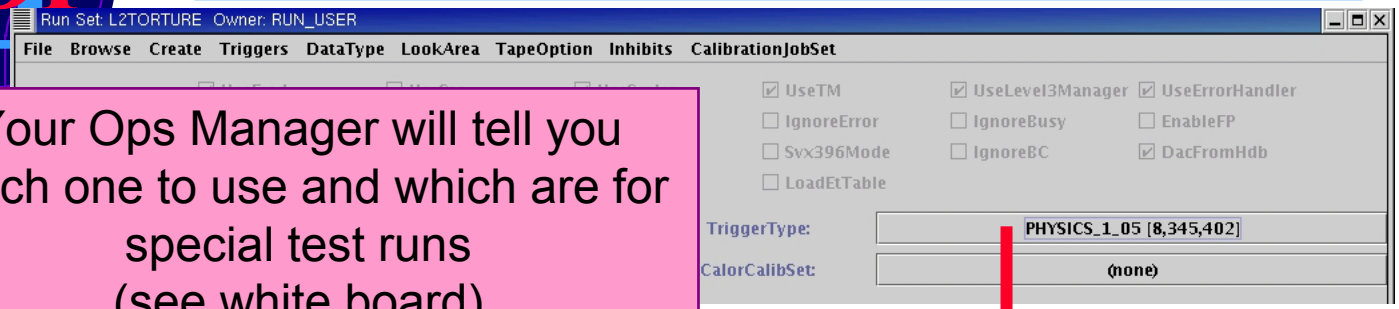
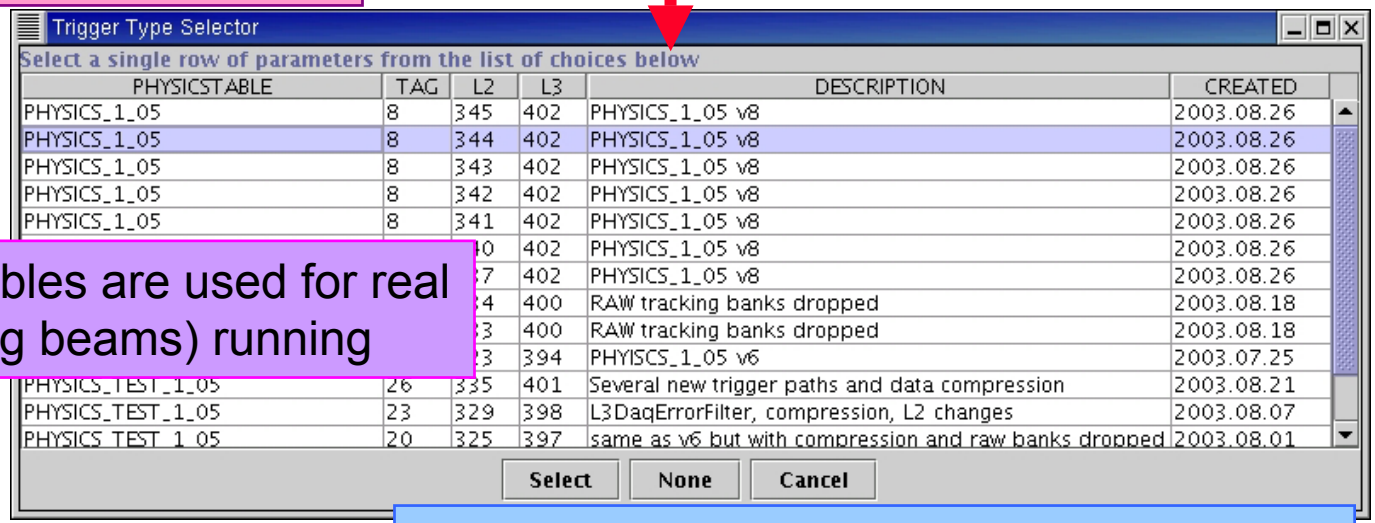
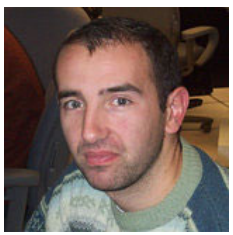
Your Ops Manager will tell you which one to use and which are for special test runs
(see white board)





Coupled Trigger Tables are used for real physics (colliding beams) running

You will often see PHYSICS_TEST_… tables that experts may request to run at the end of stores



Guillelmo sez:
"Selecting a TriggerTable that does not crash Level 3 is the Ace's most important duty!"

Decoupled Trigger Tables

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Trigger Type Selector L1+L2..L3 Decoupled

Select a row of parameters from *each* of the two lists below

PHYSICSTABLE	TAG	L2	CREATED
CCAL_TEST	1	356	2003.04.03
CCAL_TEST_TRACKS	1	370	2003.12.18
COSMICS	12	364	2003.11.06
COSMICS	12	361	2003.11.06
COSMICS	12	358	2003.11.06
COSMICS_L2_MUON	1	374	2003.12.23
COSMICS_L2_MUON	1	373	2003.12.23
COSMICS_NOTRACKS	6	353	2003.05.06
L2_TORTURE	15	351	2003.11.12
MINIMUM_BIAS_1	11	368	2003.05.06
MUON_TEST	37	375	2003.12.19
MUON_TEST	37	371	2003.12.19
SUMET5	4	352	2003.05.06

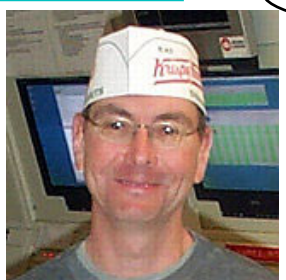
L3	DESCRIPTION	CREATED
409	L3_TEST_51_PASS_ALL_RECO v1 5.1.0 test table	2003.12.10
406	TEST_L3PS5 v2 4.8.4 for RH7.3	2003.11.06
405	NULL v2 4.8.4 for RH7.3	2003.11.05
403	L3_PASS_ALL_RECO v11 RH7.3	2003.10.06

Select | None | Cancel

None is a valid option when using the calibration trigger

Lots of *decoupled* trigger table options,due to combinatorics of unspecified Level 3 paths

Greg Sez: "Selecting the correct Trigger Table that doesn't break Fred is the Ace's most important duty!" (plus bringing Greg Krispy Kreme doughnuts to make him fat)



Crate Editor

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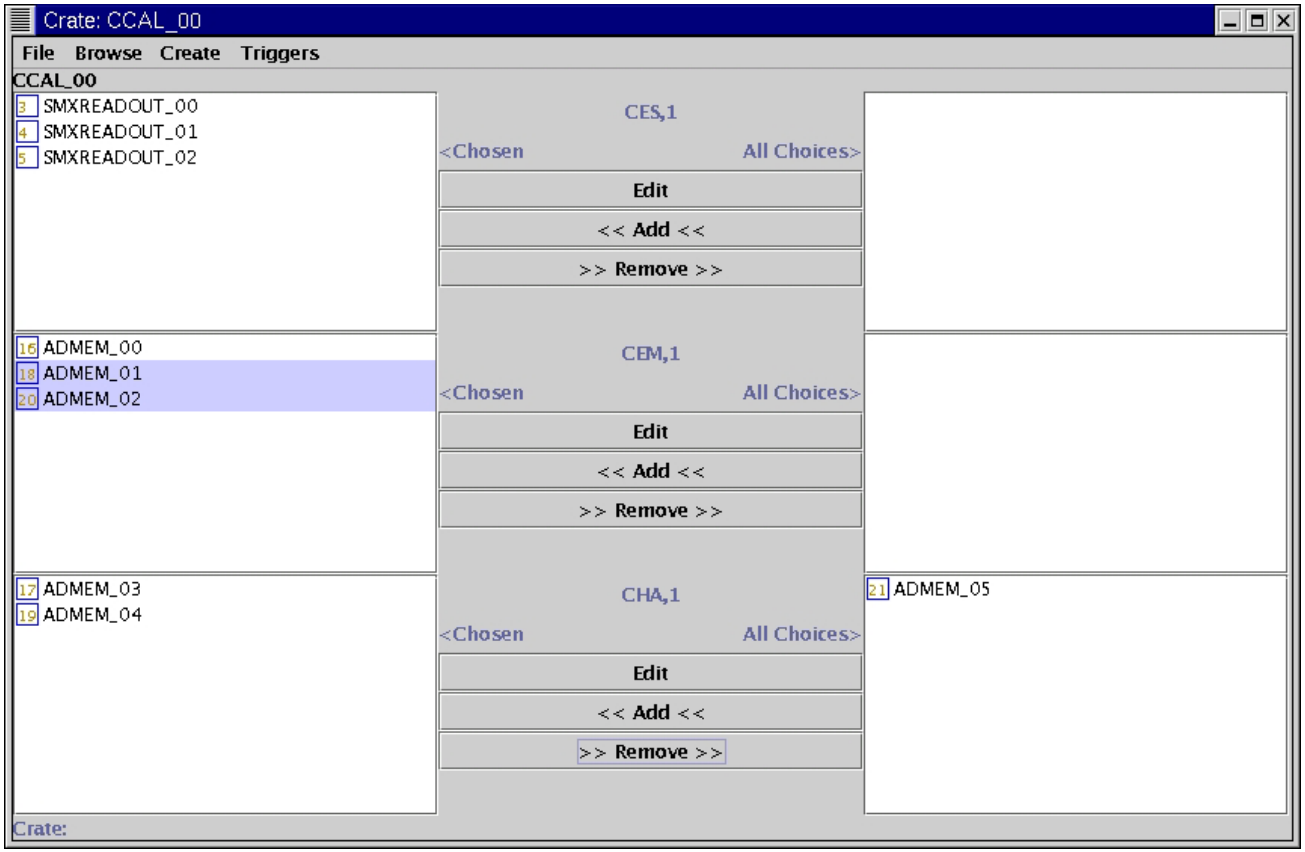

CrateEditor shows which cards will be read out, grouped by bank

Cards can be removed from readout, but only in **emergencies**
Notify expert *immediately* if you remove a card!

Component expert? Select card and press *Edit* for more info on the card
Use caution when changed database connection

Proxy Control Menu

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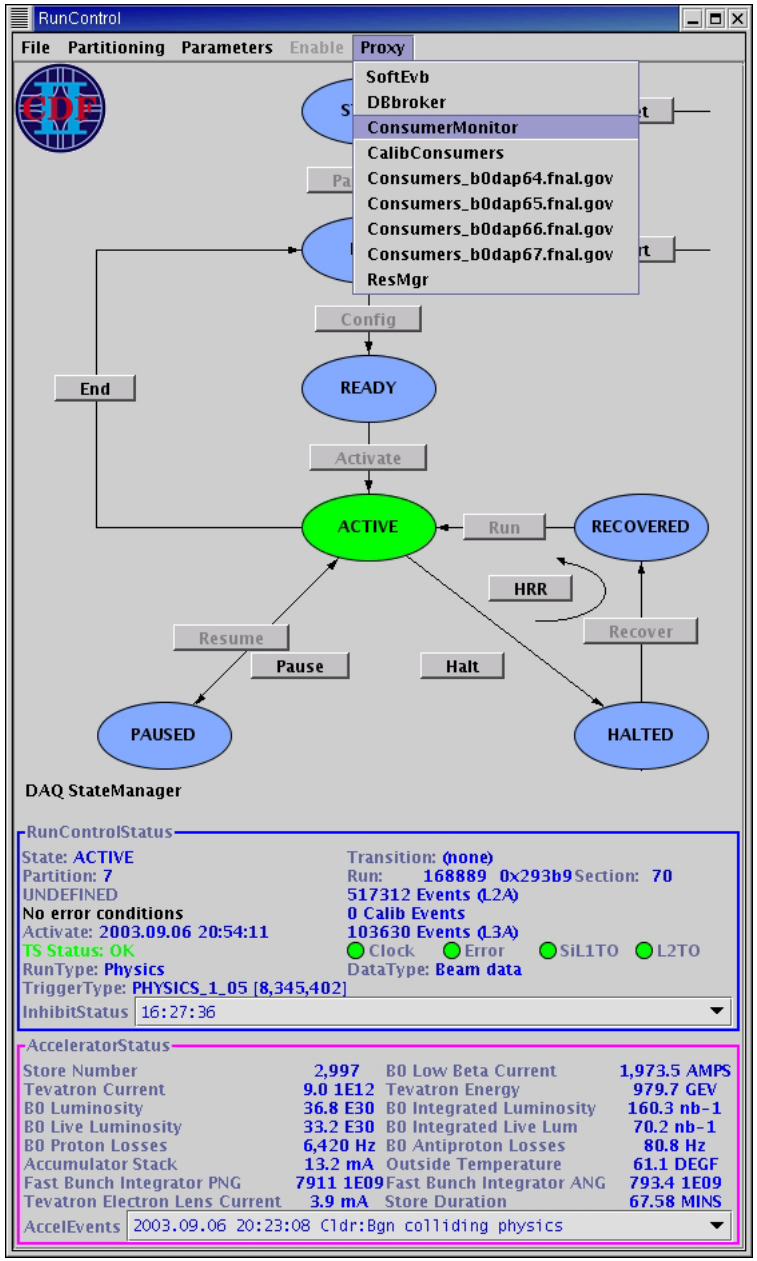

The Proxy gives you control over remote data acquisition processes:

- Software Event Builder
- Database Broker (for SVX)
- Consumer Monitor
- Calibration Consumers
- Resource Manager
- Physics Consumers (to be implemented)

SoftEvb Proxy Viewer

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If you don't get responses from the Software Event Builder during transitions, then check the SoftEvb Proxy, and stop and/or restart if needed

Status colors:
- Green: Up and running
- Cyan: not running

Click on main button for detailed information

CalibConsumer Proxy

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Use the Calibration Consumer Proxy to see if your calibration consumer is still running

Resource Manager Proxy

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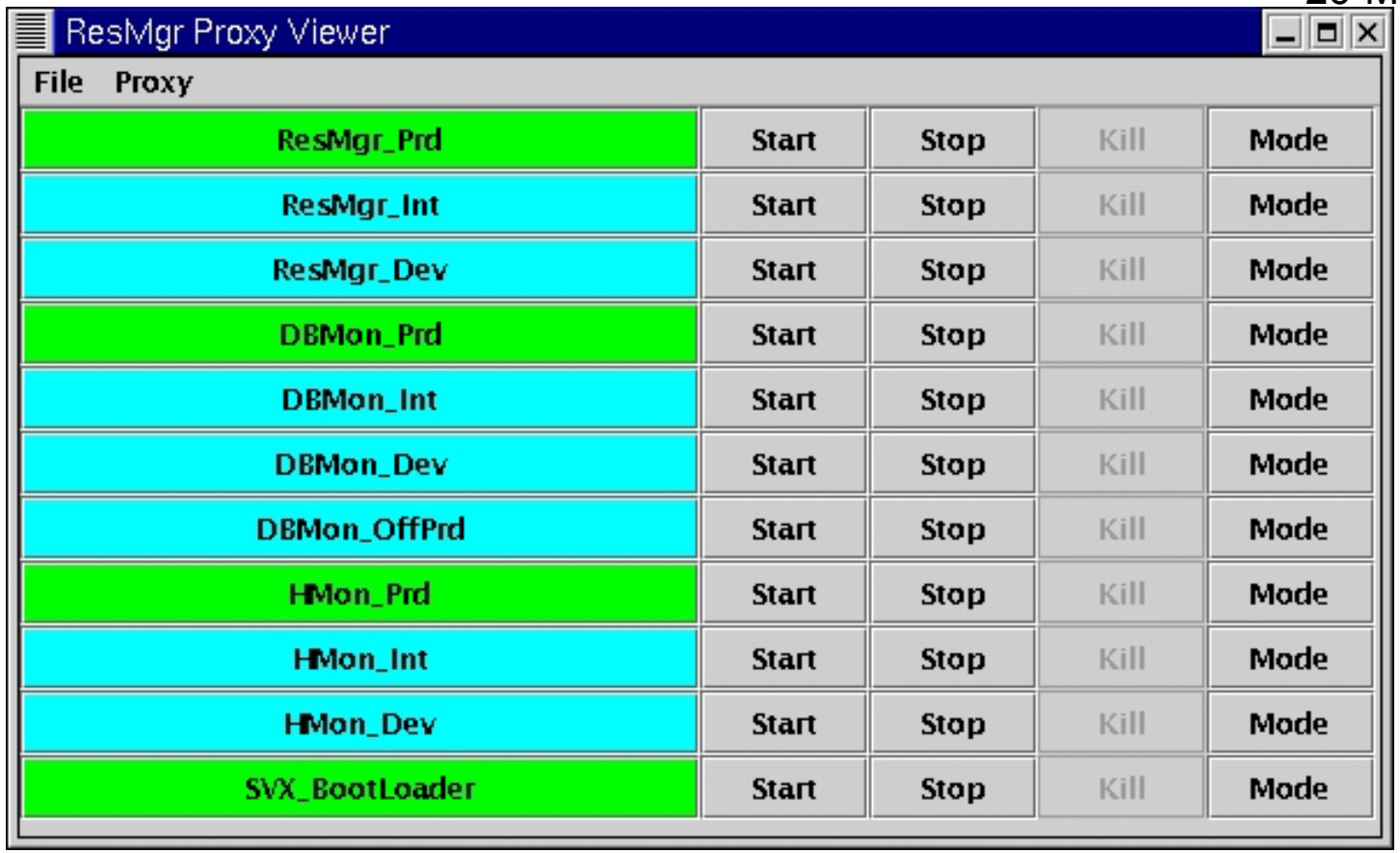

Having a problem with *Sticky Partitions*?
Try restarting the ResMgr_Prd
You can't hurt anything!

Transition Sequencing

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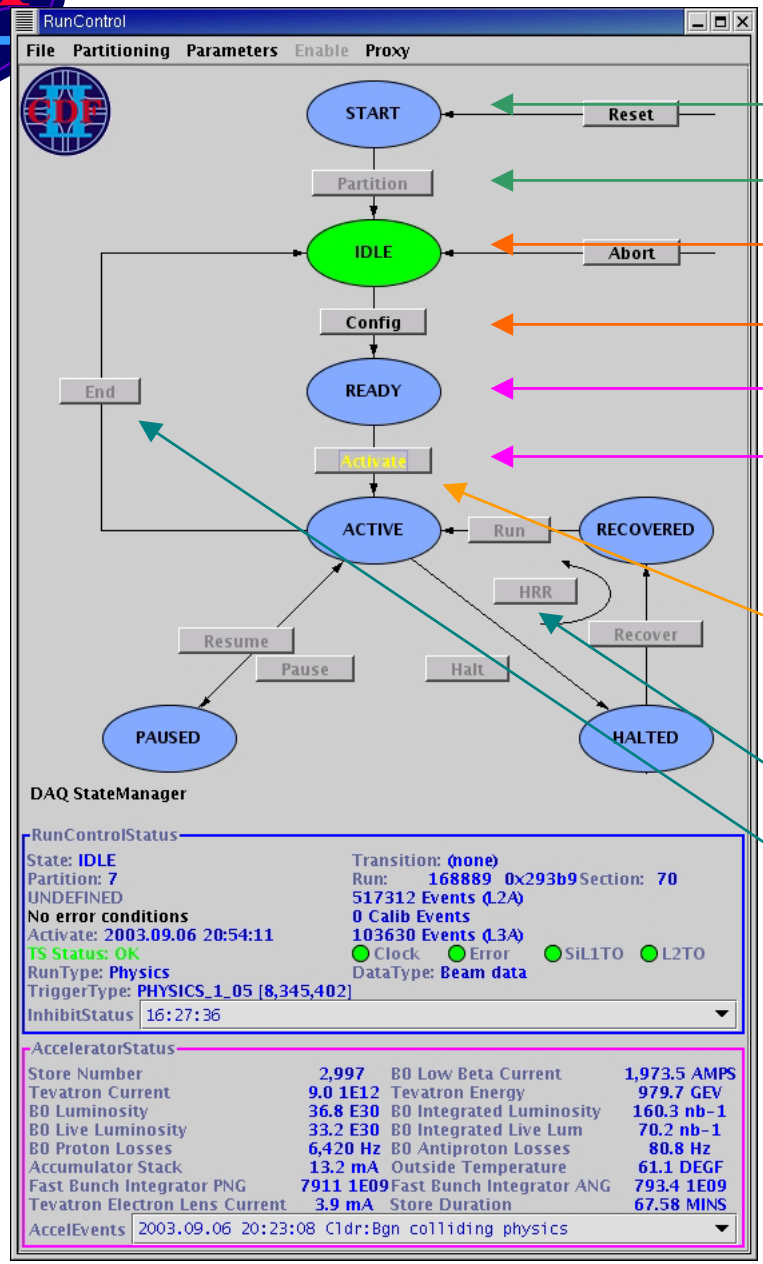

At *Start* state, select all desired clients and *Partition*

At *Idle* state, configuration must be fixed, then *Config*

At *Ready* state just about prepared to take data, then *Activate*

Note use of *click-ahead* (shift key plus mouse click) so that Activate will automagically engage when it becomes available

To fix problems, try ***Halt Recover Run***
When *Active* and ready to finish run, ***End***

Abort and *Reset* always available to get you out of sticky situations
Use sparingly!

Transitions

- **Partition**: Select front end crates and clients for the run; configure trigger and return crosspoints
- **Config**/**Setup**: Configure crates and clients with info that could change run by run, without adding or subtracting RC clients (slowest transition)
- **Activate**: Final step to enable system to take data (fast)
- **End**: Normal end of run, produces end of run summaries
- **Abort**: Return to Idle when no other option available
- **Pause**/**Resume**: Briefly stop data taking (HV trips, flying wires, inhibits)
- **Halt**/**Recover**/**Run**: Fast system error recovery, first option to use when an error occurs during data taking
- **Reset**: Return to Start state from Idle, or when no other options are available

Calibration State Managers

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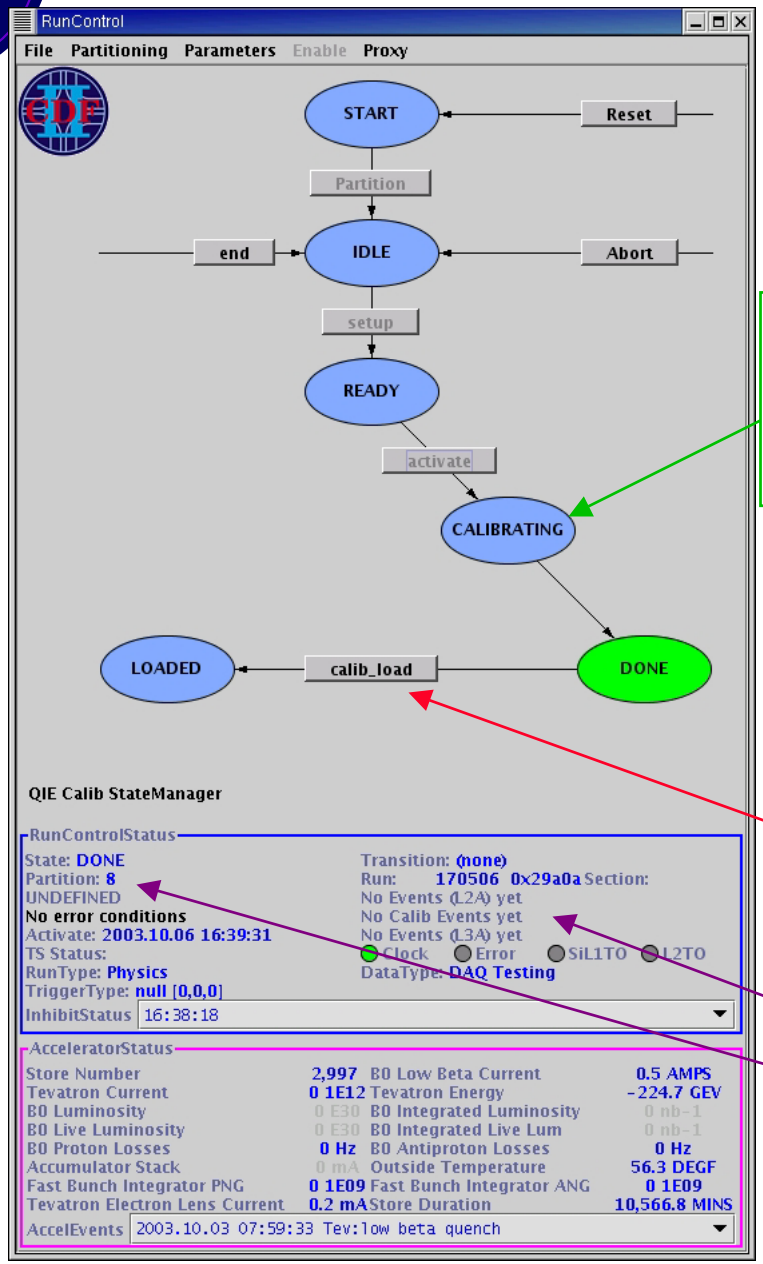

QIE Calibration State Manager

Calibrating: Transitory "fall-through" state, will drop to Done when all front end crates are complete

Know where Calibration Consumer log files are kept:
~cdfdaq/consumers/log

CalibLoad special option to do full download of AdMem FRAMs, by expert request only

QIE Calibration may be done in software partition, no hardware triggers are generated

RunControl in action

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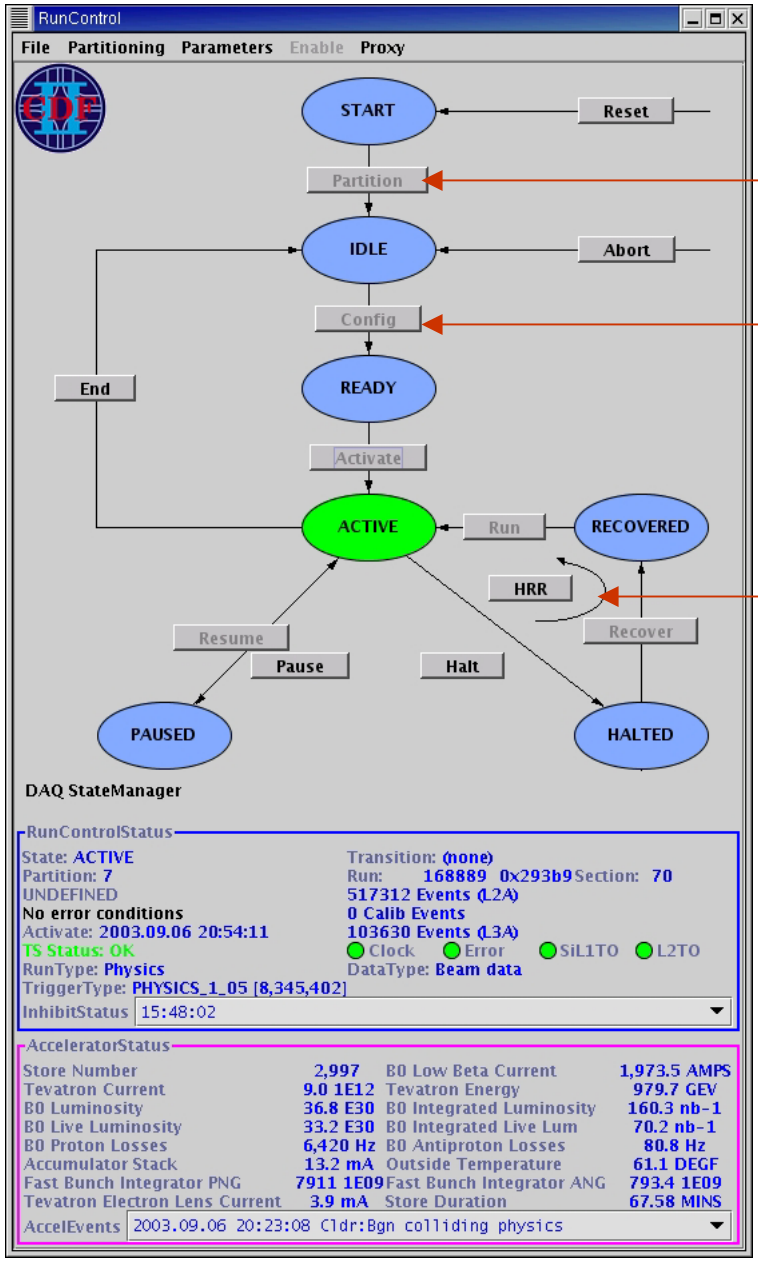

Partition: choose front end crates and other virtual clients to participate in the run

Config: configure hardware and software for desired run type

HaltRecoverRun: quickly reset the entire DAQ and trigger system for fast recovery, minimize dead time; Normally use express HRR button

StateManager

- User initiates *transitions* between different *states*
- Goal is to stay in the *Active* state until run is complete, taking recovery actions as necessary

Sample Transition Errors

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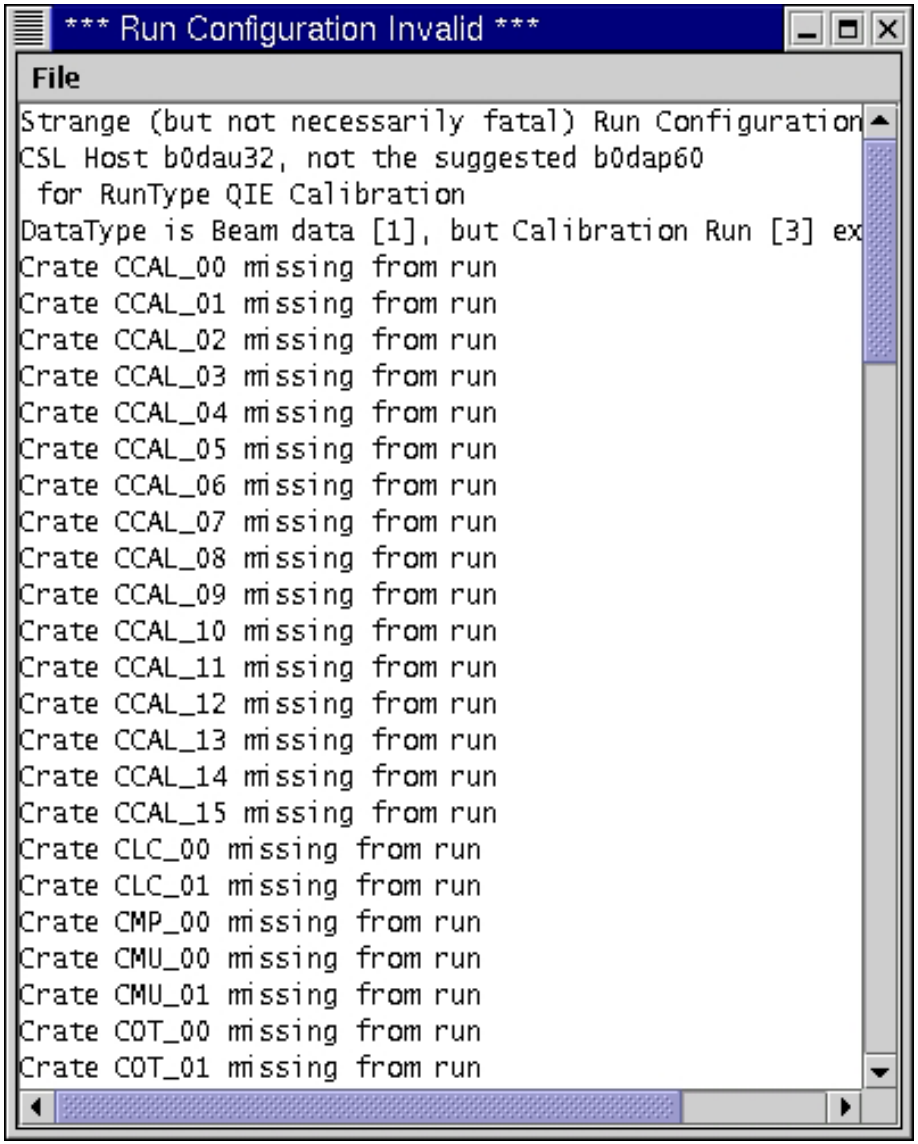

During your Run Control session, you will sometimes see warning messages pop up. This example tells you are missing some important crates during a beam physics run

Do ***NOT*** ignore any of these messages!!!

If you do not understand a message, contact the appropriate expert immediately

Reply & Acknowledgments Window

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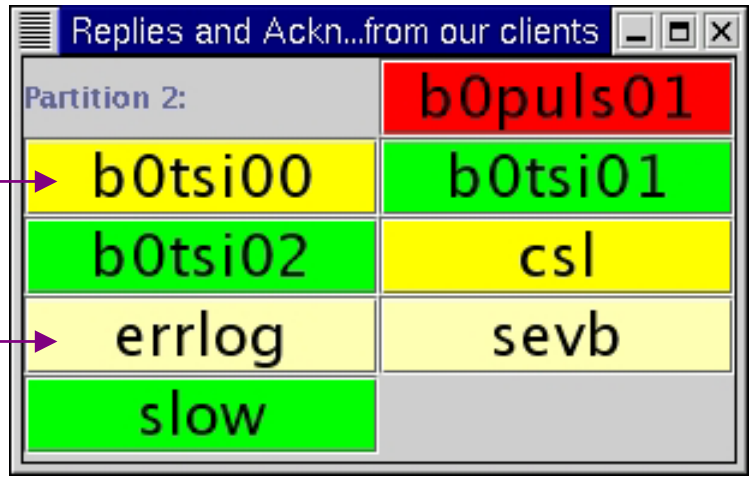

Window should always be visible

Words too small to read? Stretch the window!

This window indicates the transition status of clients:

- **Butter yellow**: RC has *not* sent transition yet
- **Margarine yellow**: RC has sent transition, *waiting* for acknowledgment
- **Green** Client sent successful acknowledgment
- **Red** Client reported an error during transition – check error log

Click on the client button for more info and the client's *Local Controller*

Local Client Controller

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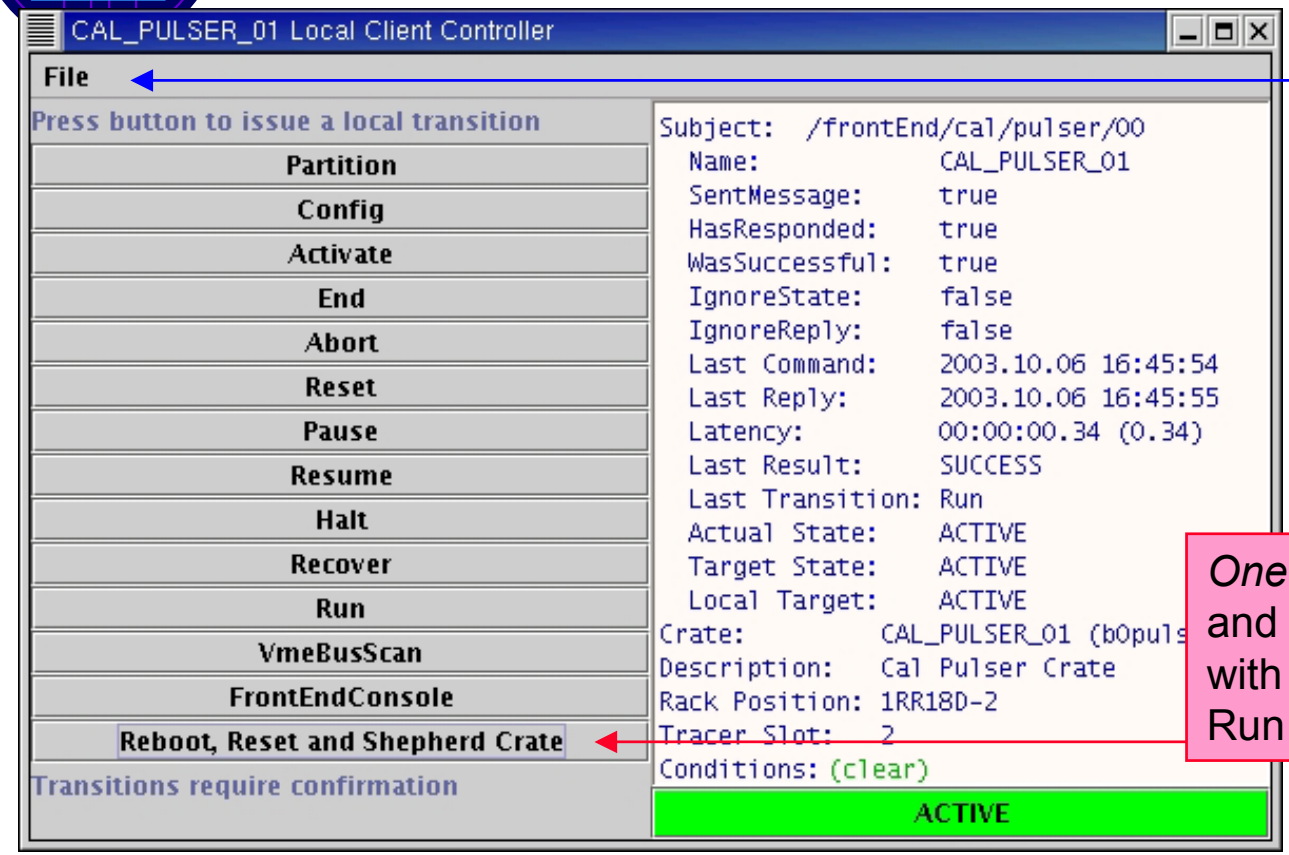

File menu gives you access to the contents of the configuration messages sent to the client

You can send single transitions to a single crate by hand here

One-Touch shepherding: reset and bring crate back into line with other Run Control clients

Allows you to **shepherd** individual clients through the transitions
Can be used if one client out of many fails a transition
Be careful to retain the same configuration!!

Avi sez: "We need a mouse-click database!"

VmeBusScan Button

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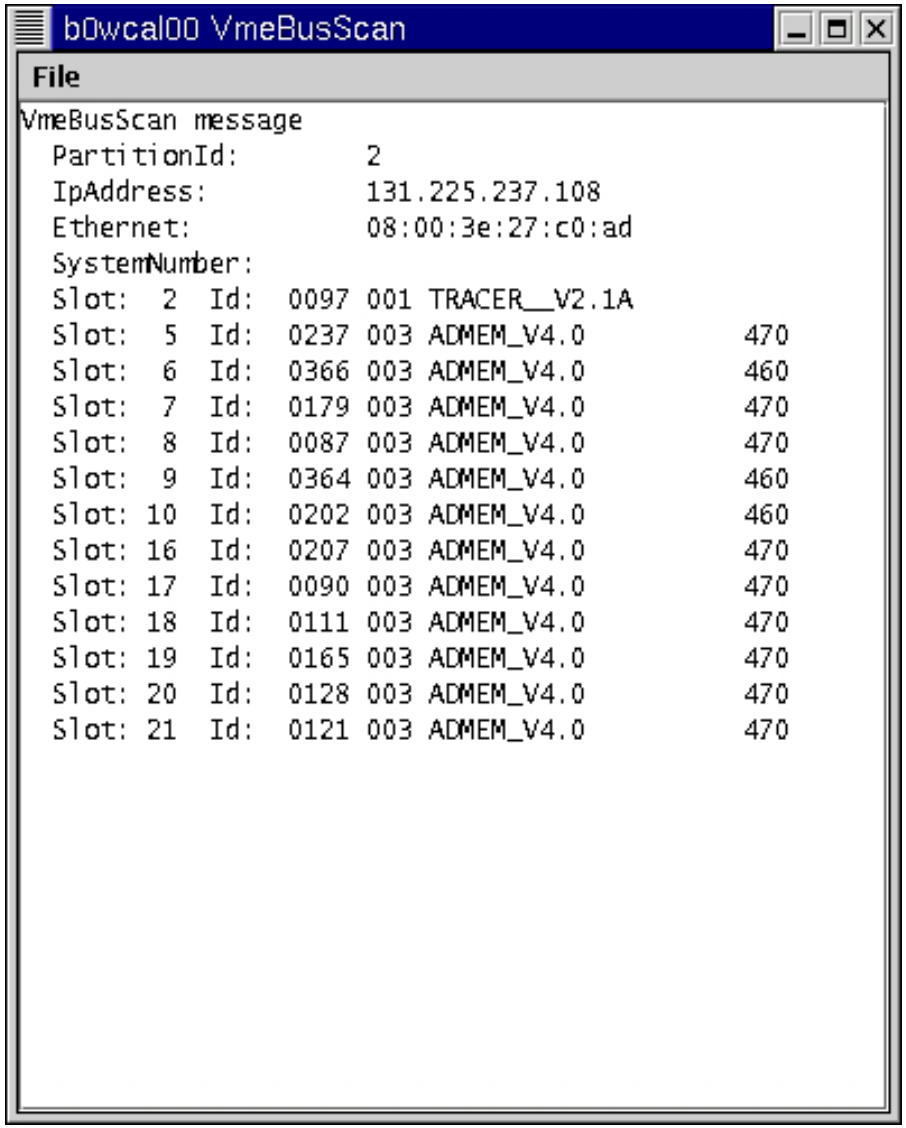

Choosing VmeBusScan from the Local Controller window returns a scan of all cards in the front end crate

Useful for verifying the presence and basic functionality of readout cards

FrontEnd Crates Control I/O

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Ethernet port:
- vxlogin
- RunControl transitions

TCP/IP 100 Mb/s

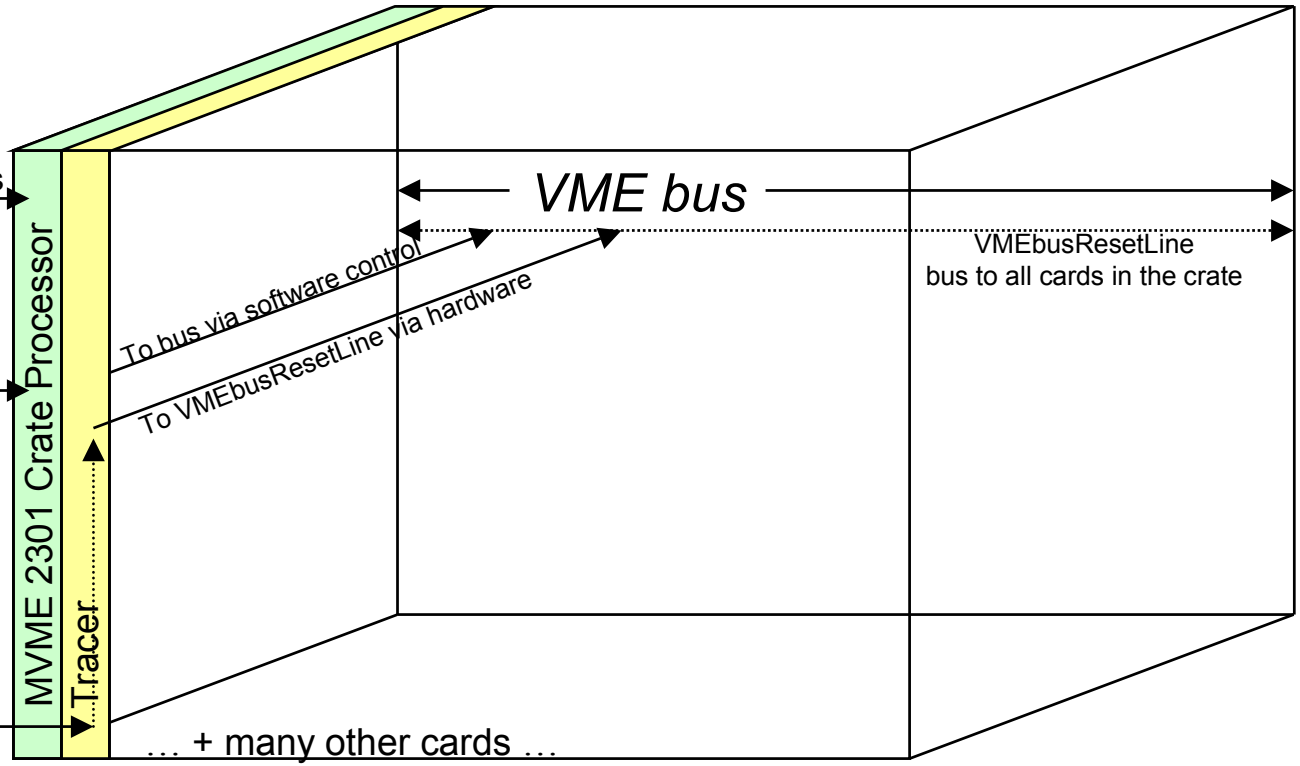
Serial port:
- minicom on *b0dap10*
- FrontEndConsole from RunControl local controller

serial 9600 baud

Reset line:
- reset_crate
- Reboot, Reset, Shepherd…

from RunControl local controller
- originates at *b0res00* crate

unidirectional pulse



From three into many…

The Five Fold Reset Path

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Command	CPU Reset	VME Crate Reset
Reboot, Reset and Recover Crate From the RunControl LocalClientController; uses reset line and software (VISIONdemo)	*yes*	*yes*
reset_crate After *setup fer* from unix shell; proceeds via reset line to tracer and then on to VME bus	*yes*	*yes*
VISIONdemo, 9, 10 After *setup fer* from unix shell, or after logging into crate with vxlogin or minicom; proceeds via software on to the VME bus; TDCs may prefer this	*yes*	*yes*
vxboot After *setup fer* from unix shell; logs into crate processor and reboots via software	*yes*	no
reboot After logging into crate with vxlogin or minicom, equivalent to vxboot	*yes*	no

CPU vs. Crate Reset

- CPU Reset
  - Clears up any software problems or heap corruption
  - Nicer to SmartSockets rtserver
  - Does not touch any other card in the crate
- VME Bus Crate-wide Reset
  - Also reboots CPU
  - Resets all cards in the crate via the VME bus reset line
  - Often needed by readout cards, e.g. TDCs are a popular candidate to benefit from VME bus reset
  - May leave dangling connection to SmartSockets rtserver
- For persistent hardware problems, neither reset may be successful
  - Important to contact appropriate expert as soon as possible in this case

LocalClientController Details

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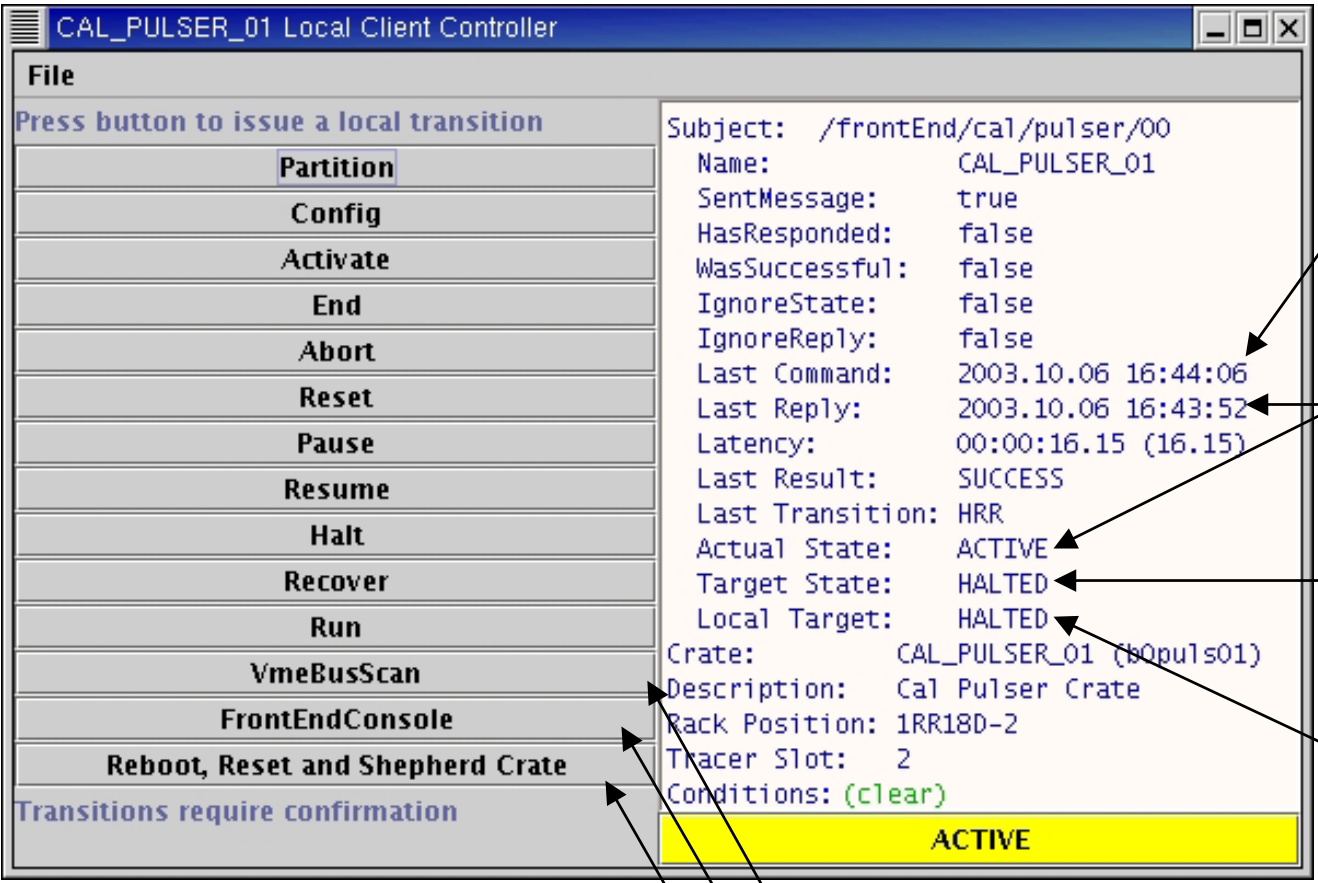


Last transition command time, from main RunControl or this indvidual controller

Last known state as issued from client, with time

Target state to match the global expected state from main RunControl

Local target state to match the last local transition issued from this individual controller

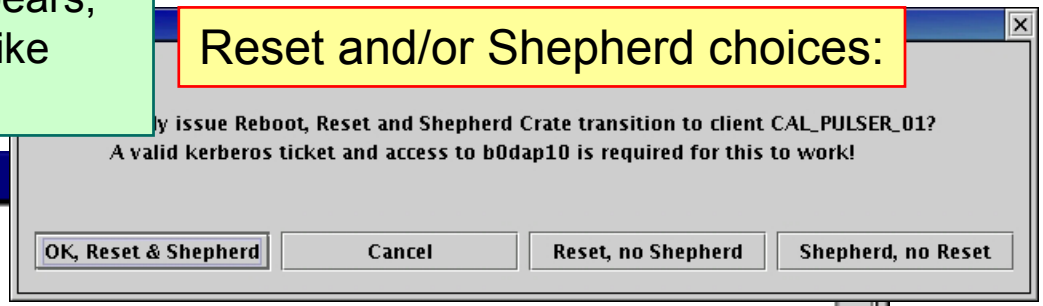
Presence of these buttons while *Active* indicates a VME crate which can be recovered in the middle of a run

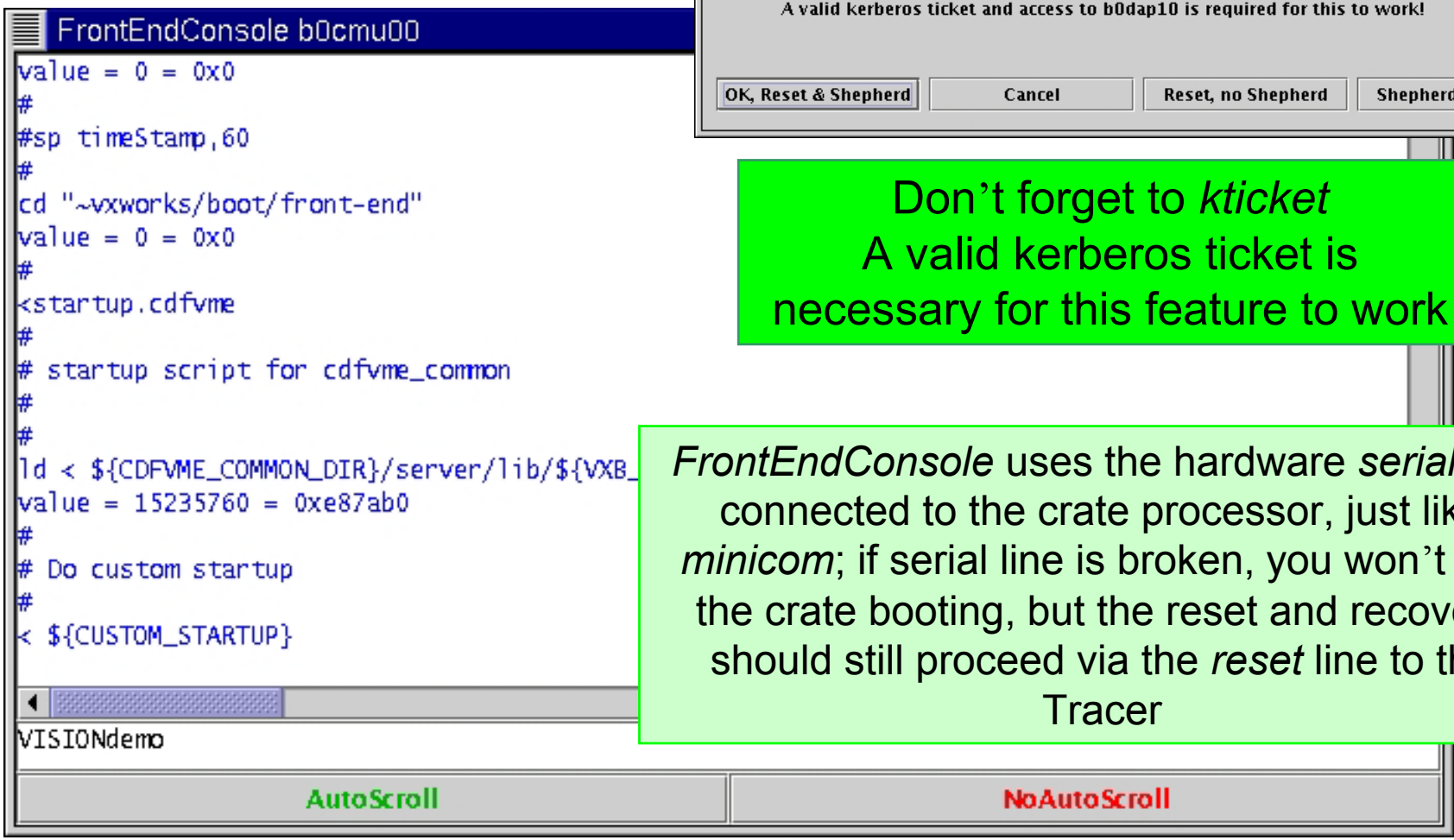
FrontEndConsole

W. Badgett
Run Control &
Run Configuration
26-Mar-2004

After a *Reboot, Reset and Recover Crate* command, a **FrontEndConsole** appears, showing the boot process, much like **minicom**

Reset and/or Shepherd choices:





Don't forget to *kticket*
A valid kerberos ticket is necessary for this feature to work

FrontEndConsole uses the hardware *serial* line connected to the crate processor, just like *minicom*; if serial line is broken, you won't see the crate booting, but the reset and recovery should still proceed via the *reset* line to the Tracer

Special Needs Clients

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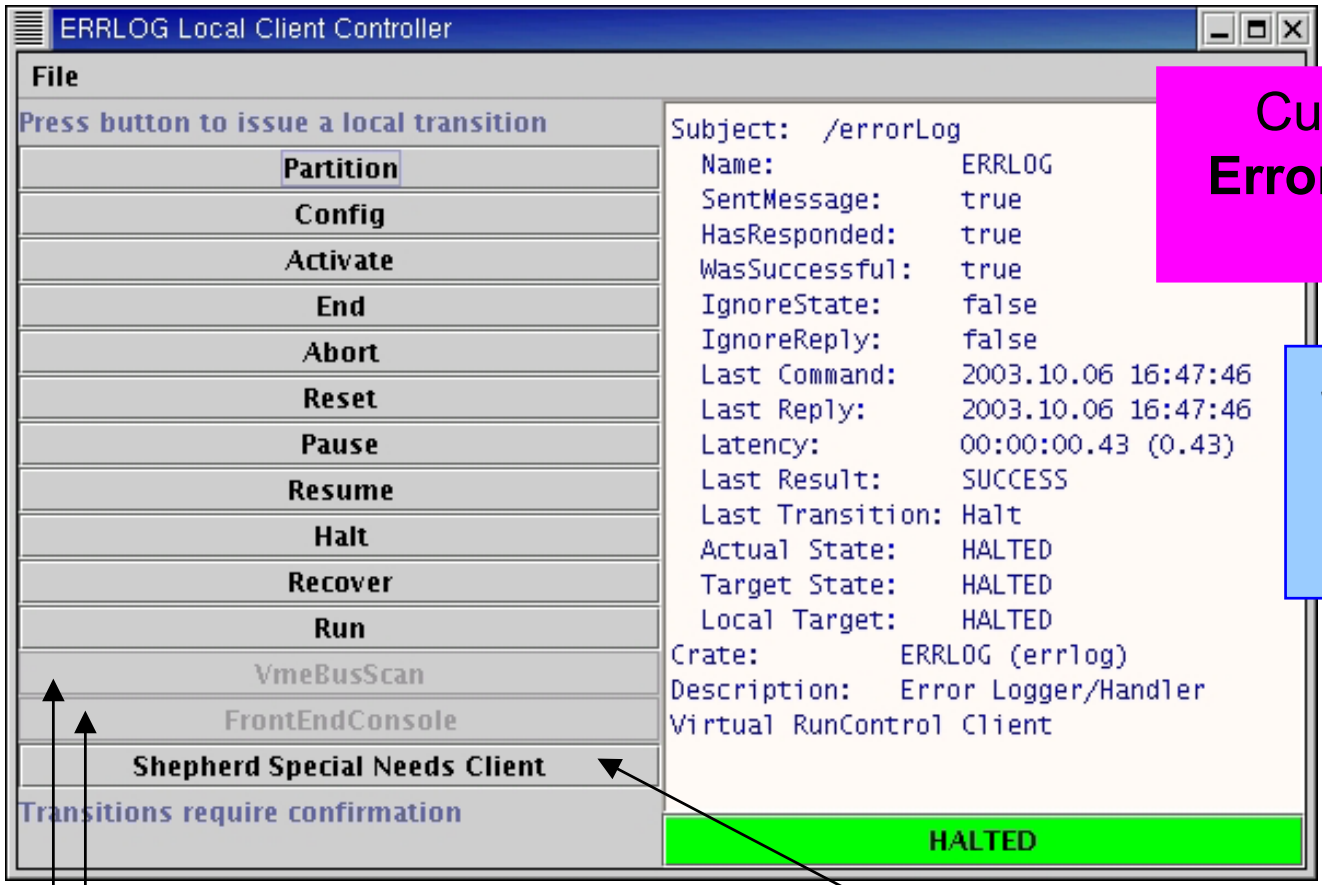

Currently only the **ErrorLogger** can use this feature

SlowControl may be another customer (in the future) others?

Disabled buttons indicate this is not a VME crate

Special Needs Virtual RunControl clients **must be restarted** per their special instructions before shepherding

ClientMonitor

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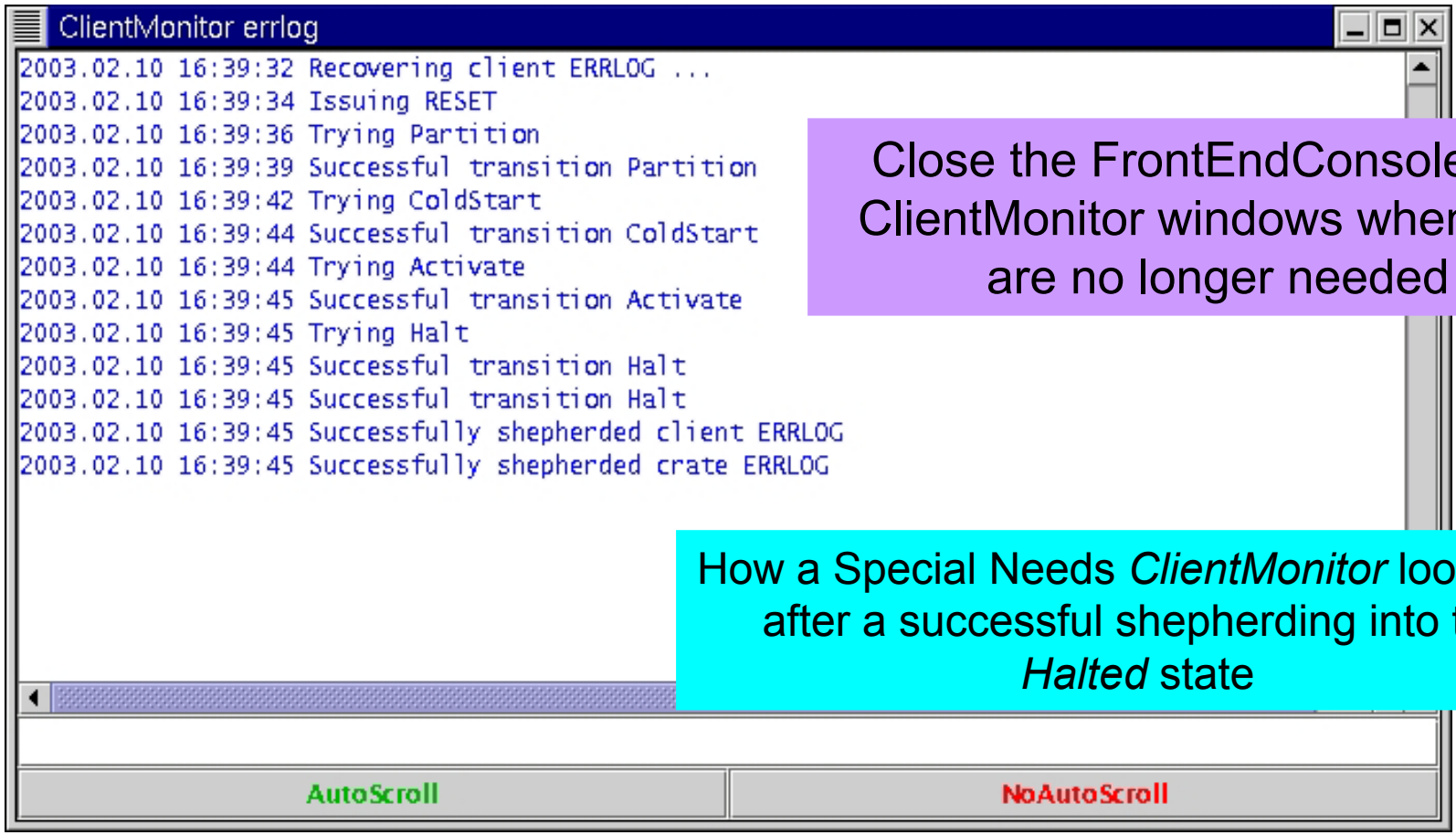
After issuing Recover Special Needs Client, a special logging window *ClientMonitor* will appear in lieu of a *FrontEndConsle*



Close the FrontEndConsole and ClientMonitor windows when they are no longer needed

How a Special Needs *ClientMonitor* looks like after a successful shepherding into the *Halted* state

Shepherding Status

- Some clients and crates should never be recovered in the middle of a run
  - http://www-cdfonline.fnal.gov/ace2help/runControl/shepherding.html
  - L1, L2, L3, HEVB, SEVB, CLC, CSL, Scalers (b0tsi03)
  - Function will be disabled in *LocalClientController* window
- Some front-end crates have reset line or serial line broken
  - All crates in collision hall working (check this!)
  - JDL promises to fix remaining (upstairs) crates someday
  - As long as reset line *or* serial line works, shepherding will work
    - although you may see warnings
    - no crate has both reset and serial lines broken

End of Run Status Box

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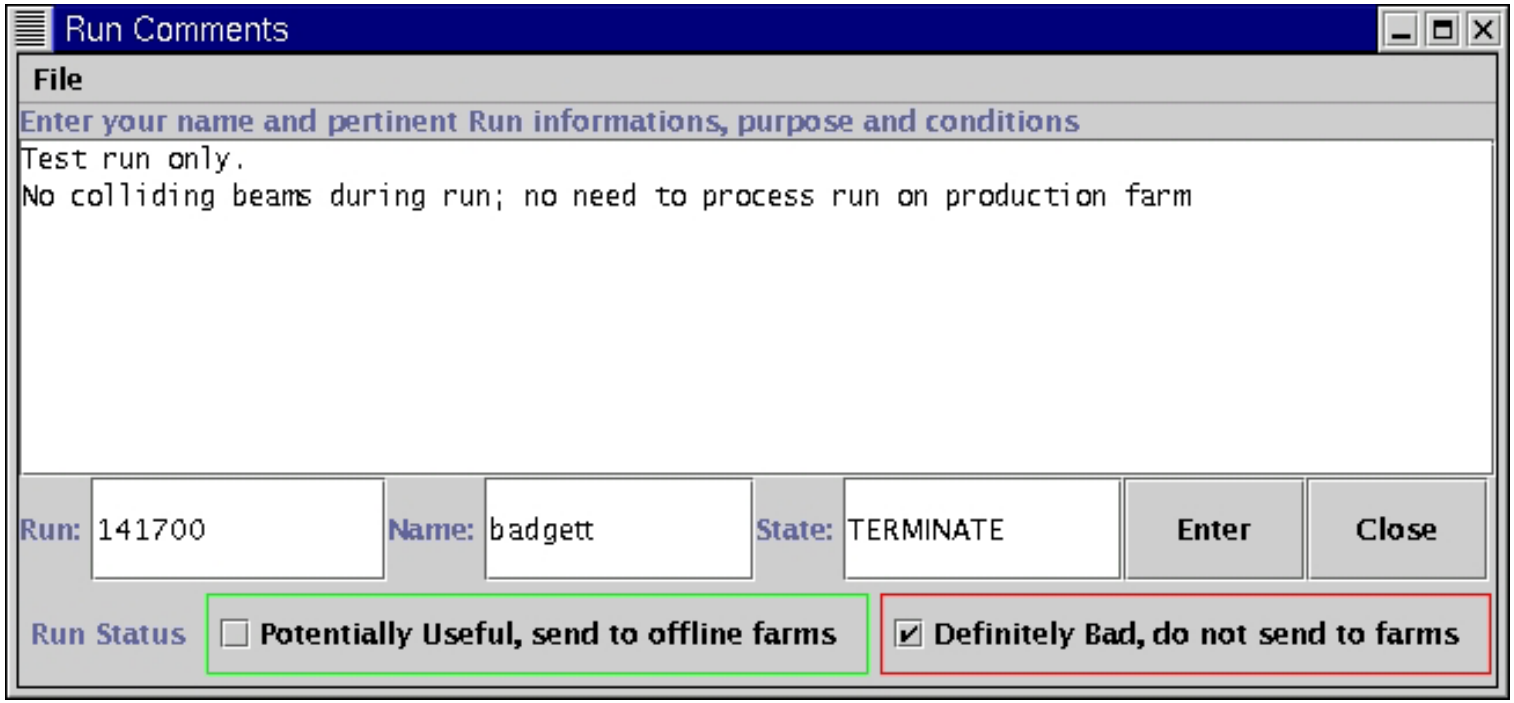

At the end of a run you will be presented with a comment box: enter any pertinent run informations

At the end of a beam physics run, you must also decide the basic run quality. When in doubt, choose *Potentially Good*

Determines whether run is processed offline!

Error Logger

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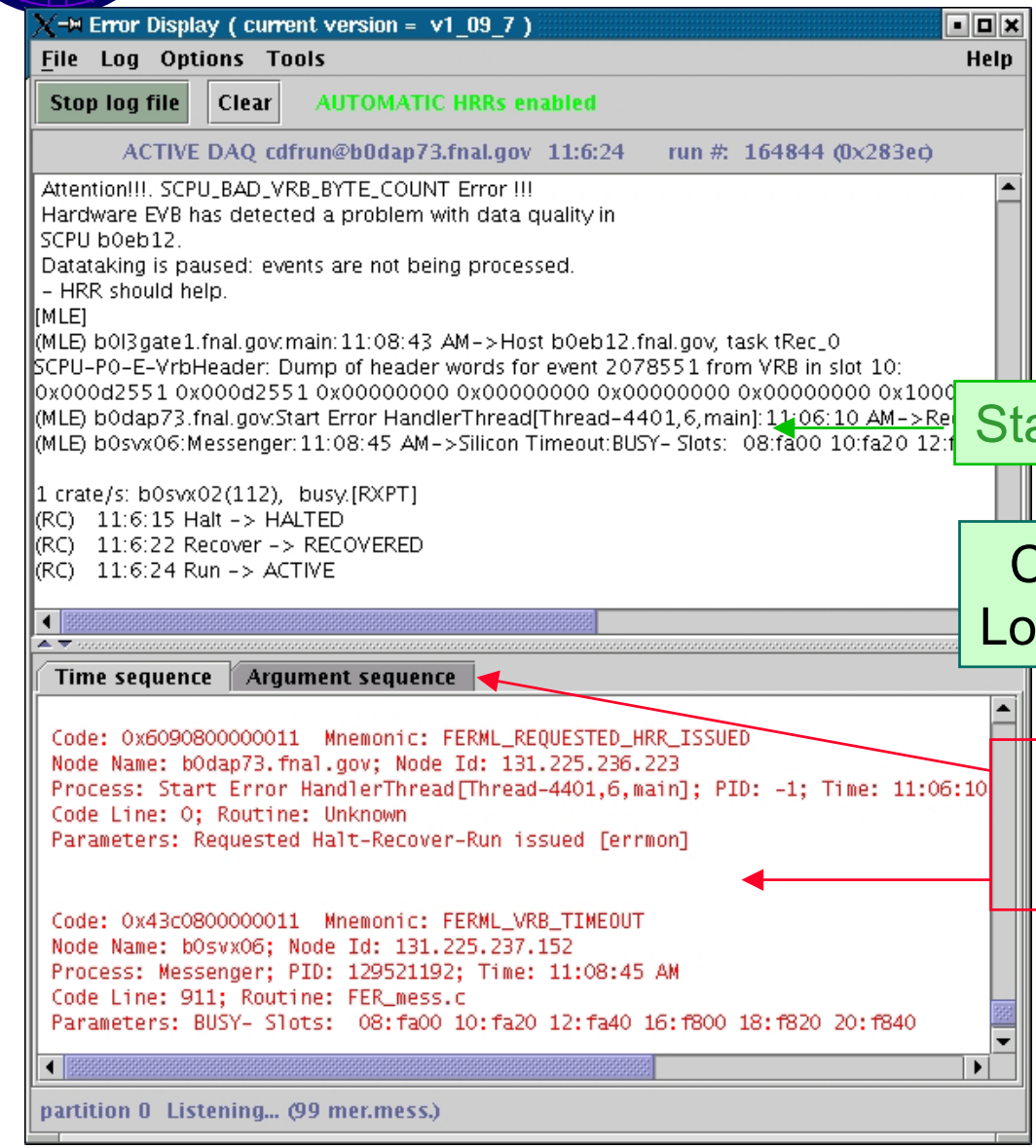

Error Logger receives and interprets status and error messages from front end crates and other clients

Status and Error Messages

Client errors on Run Control? Look here for more informations

Error Messages, with summary pane

Error Logger Control Options

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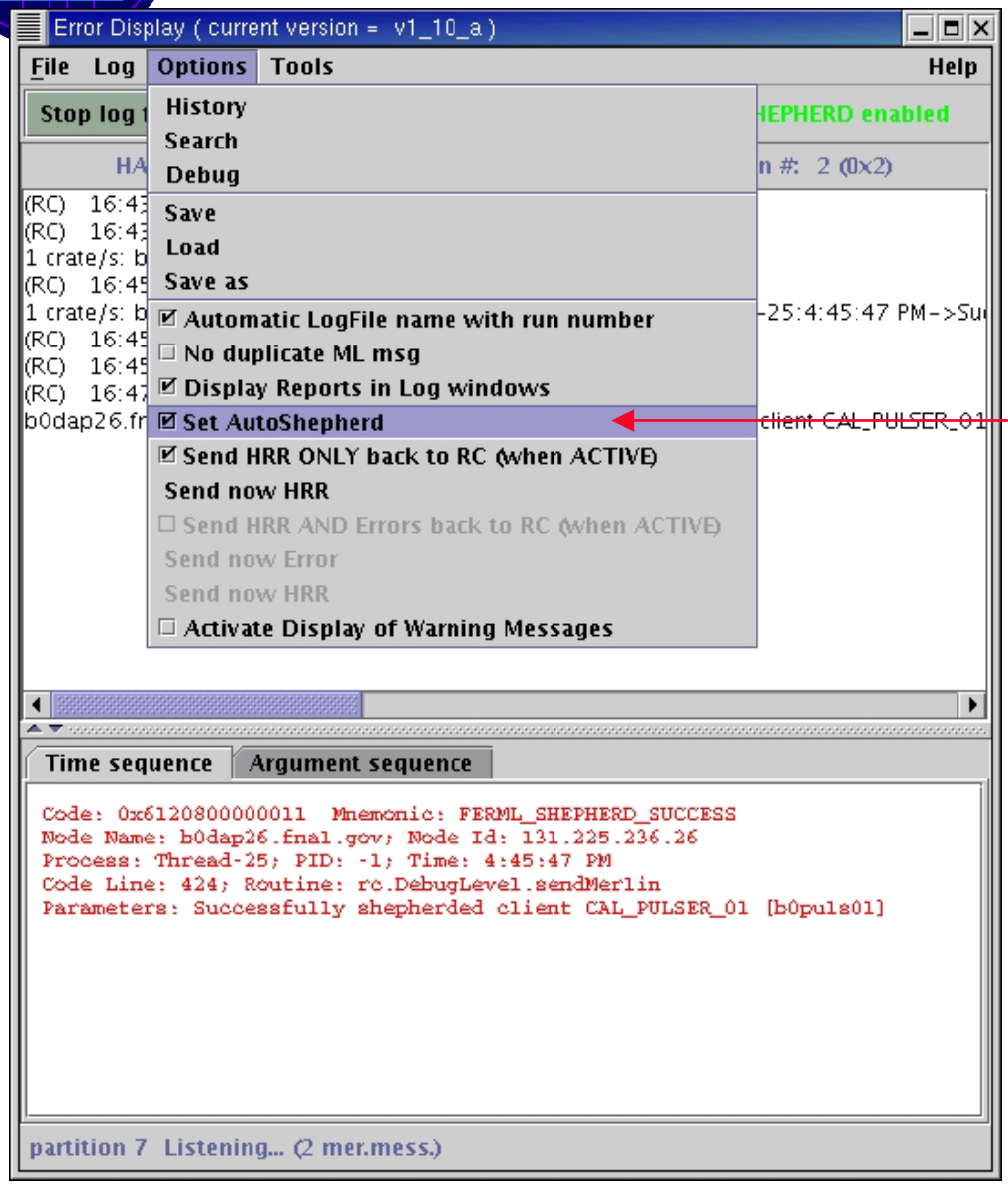

ErrorLogger can send transition commands to Run Control when specific problems are encountered

Enable automatic HRR here, should normally be on

ErrorLogger can also initiate automatic shepherding for certain types of errors, currently only TDC_GLOBAL_NOT_DONE

ErrorLogger sends orange and red warning windows to Run Control, often with special instructions on how to recover

DaqMon

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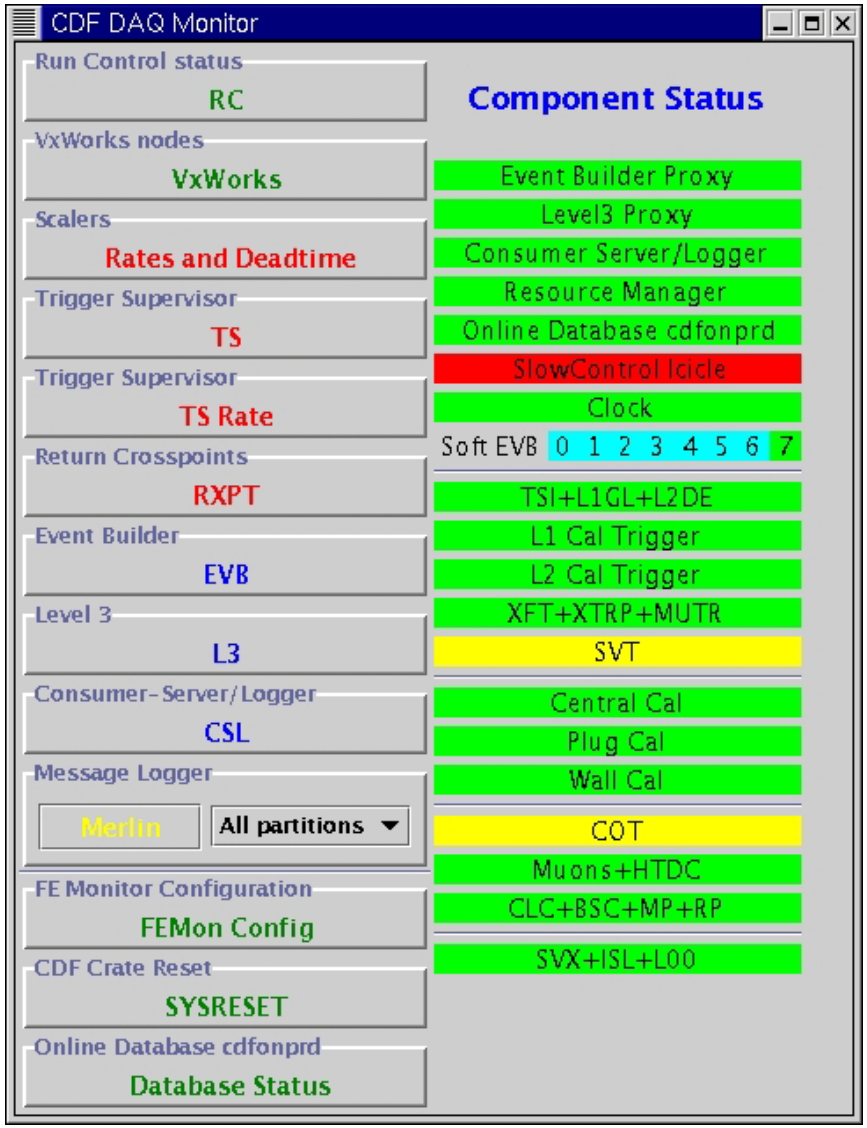

Watching Run Control status is your first line of defense
Plus, many monitoring tools are available

DaqMon is your gateway to many monitors:

setup fer

daqmon

And provides a quick glimpse status of all systems

VxMon

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At-a-glance summary of all front end crates in the system

Arnd sez: "Monitoring the Front End crates is the Ace's most important job"

ScalerMonitor

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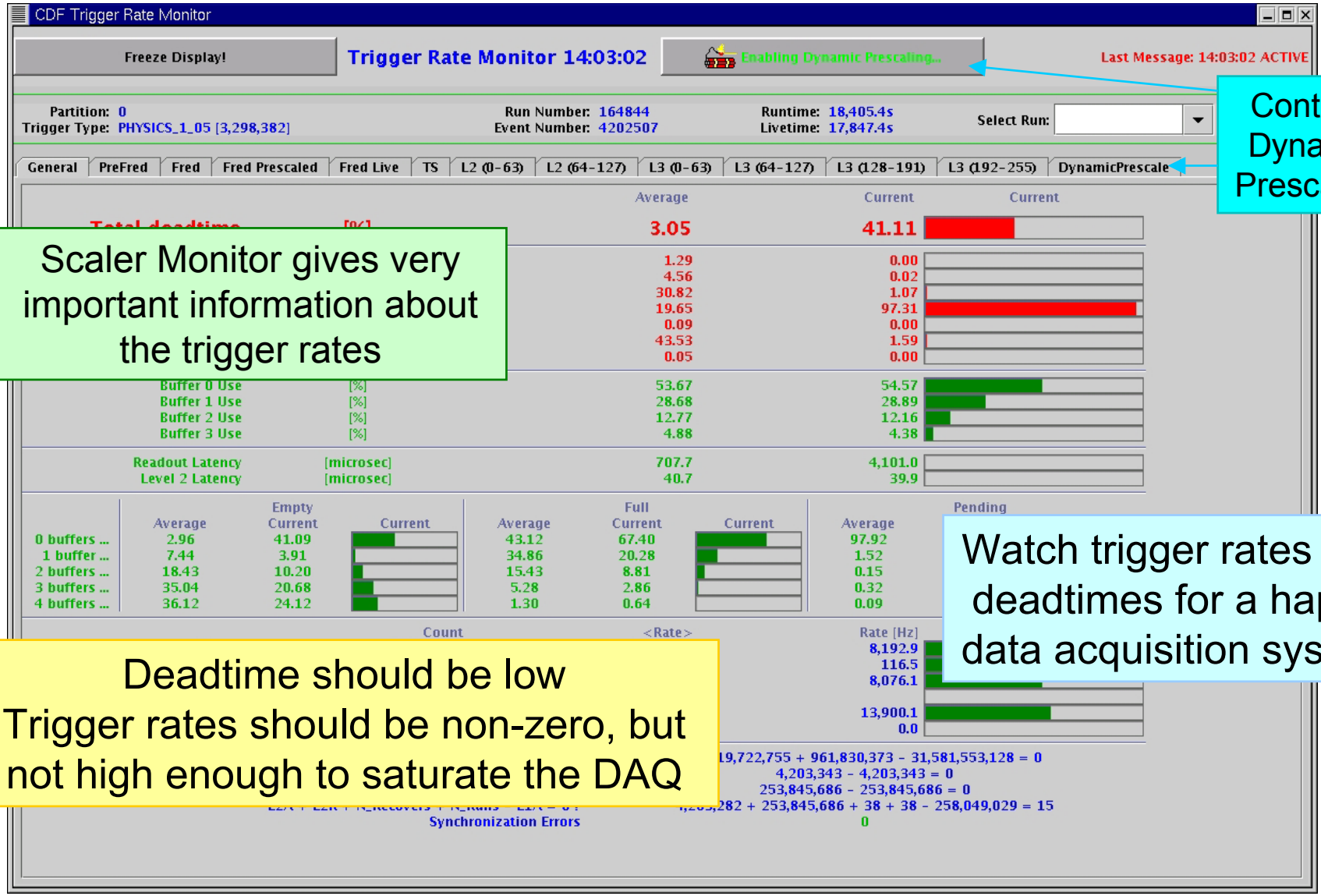
Run Configuration
26-Mar-2004



Scaler Monitor gives very important information about the trigger rates

Controls Dynamic Prescaling

Watch trigger rates and deadtimes for a happy data acquisition system

Deadtime should be low
Trigger rates should be non-zero, but not high enough to saturate the DAQ

RunSummary Web Pages

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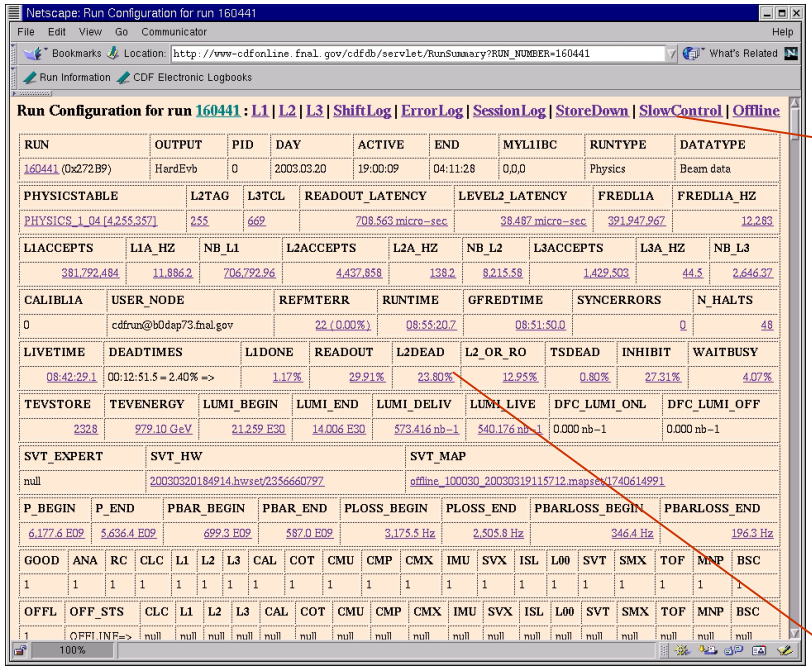
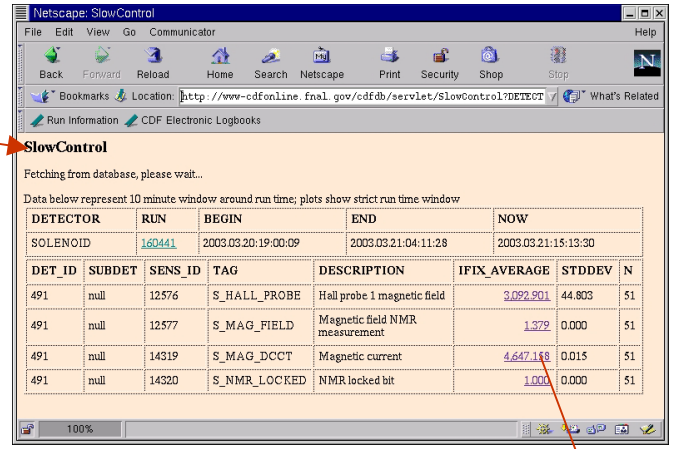
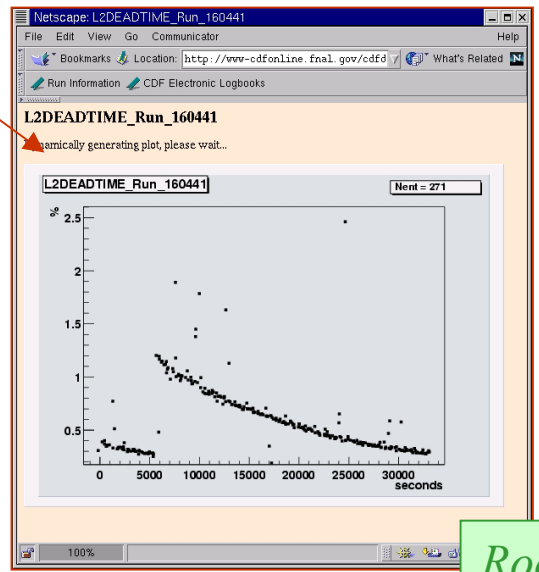
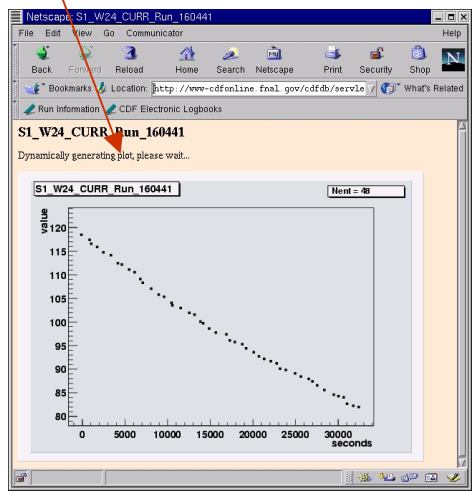
Run Control &
Run Configuration
26-Mar-2004





Run Summary Web Pages





Run summary pages are dynamically produced, with almost every quantity hyper-linked, with many of the links drawing plots of the quantity of interest

http://www-cdfonline.fnal.gov/

Follow **RunSum** and related links

Root used for plotting

Useful Monitoring Shell Commands

First you "**setup fer**", then from the terminal shell prompt, type:

- **rcd**
  - Starts up display of all RunControl states
  - Useful between stores when lots of experts around
  - Also launchable from RunControl File menu
  - Click on partition to get list of crates owned
- **resources**
  - Book a partition and crates without starting up RunControl
- **mapvme**
  - Map the VME bus of the specified crate controller
  - Fast, non-GUI text display
  - Argument is crate CPU, e.g. b0cot05
- **daq**
  - Bring up CDF VME card and crate control panels for specified crates
- **partition**
  - Display current status of all partitions to screen
  - Fast, non-GUI text display
  - Optional argument for specific partition will print booked resources

Conclusion

- DAQ Ace's main responsibility is operation of Run Control
- Before your shift, come to CDF control room and try out Run Control features, learn from experienced Aces and other DAQ experts
- Don't understand a feature or warning? Don't ignore! Find out! Page experts if necessary!
- Questions, comments, suggestions, complaints, send e-mail:

  cdf-rc-support@fnal.gov
- Urgent problems, page DAQ/RC at 722-7579